The Commercial Car Journal

VOLUME X | PHILADELPHIA, OCTOBER 15, 1915 | NUMBER 2

NEW S. A. E. STANDARDS ADOPTED

The S.A.E. has adopted all the standards approved at the summer meeting, on which a letter ballot has been taken since that meeting. The standards relate to carburetor flanges, carburetor air heaters, electric light bulb cases, sockets and connector plugs, electric vehicle motor voltage, motor name plates and number of cells in batteries, iron and steel specifications, flat fan belt and pulley widths, cotter pin sizes, brake lining sizes, nomenclature of cantilever springs, tests for parallelism of eyes and master leaves, eye bushing and bolt tolerances, wrapped eyes, width of spring ends, frame brackets, offset of center bolts, nuts for spring clips, center bolts and nuts, spring width, number of bolts, flange widths and bolt hole circle diameter of bell housings.

SPLITDORF PAYS ONE MILLION DOLLARS FOR PATENTS

A million dollars for basic patents of the Dixie magneto was paid recently by the Splitdorf Electrical Co., of Newark, N. J., to the Sumter Electrical Co., of Sumter, S. C., which controlled them through the invention of their president, Charles T. Mason.

The Splitdorf Electrical Co. is building as high as fifteen hundred Dixie magnetos daily—single cylinder, two cylinder, fours, sixes, eights and twelves—to meet the tremendous demand.

The Splitdorf Electrical Co. will continue to manufacture the line of Sumter magnetos for the stationary engine, marine and tractor field formerly controlled by the Sumter Electrical Co. at Sumter, S. C., but the Splitdorf Electrical Co. will manufacture and sell the automobile, motorcycle and aeroplane Dixie models exclusively at its huge plant at Newark, N. J.

GENERAL MOTORS CUTS MELON

The General Motor Co., Detroit, declared a cash dividend of 50 per cent. on the common stock of $50 per share. The board of directors also recommended the inauguration of regular quarterly common stock dividends, the rate to be determined by the income board. The company has outstanding common stock amounting to $16,501,783 and $14,985,200 in preferred. This dividend is the first that has been paid on common stock. Gross sales for the year just closed amount to $94,424,841, as compared with $85,371,302 for the last year.

NATIONAL JOBBERS' ASSOCIATION TO CONVENE IN KANSAS CITY

The National Association of Automobile Accessory Jobbers, which planned to hold a convention in Excelsior Springs, Mo., on October 20th, 21st, 22d, has found that owing to its rapid growth and the number that will attend, it will be unable to secure hotel accommodations in Excelsior Springs. In consequence of this the convention will be held on the same dates at the Hotel Muehlebach in Kansas City. No doubt after the meeting a number will proceed to Excelsior Springs to enjoy the magnificent golf course and other pleasures of the famous health resort.

Table of Contents

	PAGE
Accessories and Appliances	26
Advertisers' Index	115
Chicago Mail Service, Horses and Street Cars Ousted From	25
Commercial Car Efficiency Increased by Auxiliary Equipment—By E. S. Foljambe	9
Commercial Cars for Rural Free Delivery—By Lee L. Robinson	36
Dart Models Added to 1916 Line	22
Design and Construction	29
Detroit Package Wagon	17
E. V. A. Convention, Cleveland	49
Editorials	7
In the World of the Electric	49
International Motor Truck Has Low Wheels and New Heavy-Duty Engine	20
Kearns One Thousand Pound Truck	21
M. T. A., of Philadelphia, Activities	33
Motor Truck Design and Construction Made Plain—By C. T. Schaefer	29
Parcel Delivery Companies Make Good Record With Trucks—By Geo. W. Grupp	38
Starting and Lighting for Trucks—By Russell Huff	34
Stegeman Truck Chasses Have Worm Drive and Four and Six-Cylinder Engines	24
Wichita Worm-Drive Commercial Car Models	19

MOAKLER CLAIMS FRONT-WHEEL DRIVE RIGHTS

John W. Moakler, of East Worcester, N. Y., claims United States patents priority for the front wheel drive, and has issued a patent notice stating that all manufacturers of front wheel drive vehicles are violating his United States Patent No. 766,191 of August 2, 1904. He claims that parties making such vehicles, their agents and customers will be held responsible for damages. His claims cover the use of a universal joint in proximity to the pivoted parts of a steering knuckle, either above or below the knuckle or at its center.

FIRESTONE HOLDS ITS BIGGEST AND BEST SALES CONVENTION

The annual sales convention of the Firestone Tire and Rubber closed on Thursday evening, September 30th, at Akron, Ohio. For three days branch managers and salesmen from every branch in its world-wide organization attended the various activities scheduled for the annual event. Every state in the Union and six foreign countries were represented, about five hundred men being in attendance.

These men attended general conferences each day where they were addressed by company executives, branch managers, and salesmen. The subjects included Carriage, Motorcycle, Bicycle, Motor and Pneumatic Tires, Accessories, Rims, Exports, Adjustments, Credits, Advertising, and Factory and Branch Efficiency. To balance this theoretical side of the tire business each man spent a certain amount of time in the factory where, he studied from every angle the detailed construction and manufacture of Firestone tires.

In this intimate study of business conditions in general, and the tire business in particular, these men gained a large amount of invaluable information. This information will in turn be given by each salesman to the customers in his territory. Thus through the days of intensive study and generous exchange of ideas the tire user is the ultimate gainer. Dinners and outings at the lakes around Akron, theater parties and banquets at local hotels featured the entire week. Conviviality and good fellowship were dominant during the entire progress of the convention. Company officials unanimously agreed that in point of attendance, interest aroused and results accomplished, it was the biggest and most successful convention ever held by the Firestone Co.

KELLY MOTOR TRUCK COMPANY CHANGES NAME

Owing to a confusion in the names of the Kelly-Springfield Motor Truck Co. and the Kelly Motor Truck Co., Springfield, Ohio, the latter company has changed its name to the Sunset Motor Truck Co. There is absolutely no change in the name or policy of the Kelly-Springfield Motor Truck Co., and the manufacture of Kelly trucks will go on as heretofore.

Motor Specialties Co., Waltham, Mass., announces that L. W. Sumner, who has been calling on the trade in connection with the sale of Excel Jacks and Bemus Timers in Kansas City, St. Louis, and other western cities, is not legally representing that company, and has no authority to sell or solicit orders for these goods, or to transact any business for it or in its name. Any orders taken by him will not be recognized by the company.

The CCJ leads in circulation, advertising and prestige

Factory News and Changes

Garford Motor Truck Co., Elyria, Ohio, is rushing the work on its $20,000 addition to the plant.

United Motor Truck Co., Grand Rapids, Mich., is erecting 1-story addition to plant, costing $850.

Gramm Motor Truck Co., Lima, Ohio, increased its capitalization from $1,250,000 to $2,500,000.

Morton Truck & Tractor Co., Harrisburg, Pa., has increased its capital stock from $100,000 to $1,000,000.

Able Motor Co., Inc., 30 Church Street, New York City, manufacturer of gasoline engine, has changed its name to the Able Engine Co.

Detroit-Wyandotte Motor Co., Wyandotte, Mich., has been reorganized and incorporated under the name Detroit-Wyandotte Motor Truck Co.

Liebe & Thompson, manufacturer of the Liebe cork filled automobile and truck radiator and engine covers, is enlarging its plant at 2155 Milwaukee Avenue, Chicago, Ill.

Vanguard Manufacturing Co., of Joliet and Detroit, is erecting additions which will increase the capacity of the plant 50 per cent. The company is now turning out 1000 winshields per day.

Republic Motor Truck Co., Alma, Mich., has increased its capitalization from $250,000 to $500,000. This makes the second time this year that the capital has been increased, it having been raised from $50,000 to $250,000.

Ajax-Grieb Rubber Co., Inc., Trenton, N. J., at a recent meeting of the stockholders announced a 7 per cent. dividend on the preferred stock and 24 per cent. on the common. The company will erect a 3-story building 200x350 ft., thus adding 210,000 sq. ft. of floor space.

Flint Varnish Works, Flint, Mich., will double the working force and employ at least 300 men when the four additional buildings, which are to be started at once, are completed. A 10 per cent. dividend was recently declared on the $500,000 common stock, which is half of the capitalization.

Kelly-Springfield Tire & Rubber Co., Akron, Ohio, has purchased the Cataract Rubber Co.'s plant in Wooster, Ohio, as a means of temporary relief for its production demands. This new acquisition will not interfere with the erection of the new plant being contemplated by the company.

Battle Creek Motor Truck Co., Battle Creek, Mich., is planning a new motor truck plant for the manufacture of a lightweight 4-wheel drive truck with a capacity of ¾ ton. The men behind the new company are Maurice Bollstrom, designer of the truck; Frederick E. S. Tucker, advertising agent, and J. E. Fellows.

Crowther Motor Co. of Philadelphia is planning the establishment of a plant in the town of Greece, near Rochester, N. Y., in which will be manufactured motor vehicles to sell for between $300 and $400. A truck will also be manufactured, which will embody a number of new features developed by Chas. E. Duryea. It is expected that the plant will be finished by January 1, 1916.

Prest-O-Lite Co., Inc., Indianapolis, Ind., is erecting a new storage battery plant, which, when completed, will give an additional 45,000 sq. ft. of floor space, an addition to the present floor space of 33 1/3 per cent. The new addition will cost $60,000, and $25,000 additional will be spent for equipment. It will be ready for occupancy by December 1st. The company is also establishing storage battery stations at all its branches.

Columbia Motor Truck & Trailer Co., Kalamazoo, Mich., will move to Pontiac. A building will be erected, and at the start the factory will employ from 50 to 60 men. It is planned to build 300 trucks during the first year. For the present work will be done in the Osmun Building, on Wayne Street, until the new building can be made ready. The Columbia commercial car is purely an assembled car, being made of standard parts. It is a 2-ton truck with a trailer to carry 3 tons, making the combination a 5-ton vehicle.

Dart Motor Truck Co., Waterloo, Iowa, at its annual meeting of stockholders on September 10th, filed reports showing that the company had a very gratifying year, the business having increased 30 per cent. over the preceding year. A 7 per cent. cash dividend was declared on the preferred stock. The following officers have been elected for the ensuing year: C. W. Hellen, president and general manager; W. A. Baxter, vice-president and sales manager; E. L. Stover, secretary, and C. C. Wolf, treasurer.

Hayes Wheel Co., Jackson, Mich., has secured the two-story building of the Pioneer Pole & Shaft Co., Anderson, Ind., which will be used for the manufacture of Hayes wheels.

This new acquisition together with the Jackson plant will, it is expected, turn out from 4000 to 5000 sets of wheels per day. The Pioneer Pole & Shaft Co., has taken a substantial stock interest in the company, and, with its extensive timber operations in the South, will be able to furnish the necessary material.

S. K. F. Ball Bearing Co., Hartford, Conn., has been incorporated with a capitalization of $2,000,000 for the purpose of manufacturing the S. K. F. bearings. The company is the American outshoot of the Swenska Kullager Fabrik at Gothensburg, Sweden. Heretofore the American end of the business has been carried on by a selling organization incorporated for $50,000 under the name of the S. K. F. Ball Bearing Co., of which F. H. Poor was manager. It is planning to erect a factory building in Hartford, the site for which has already been selected.

Stewart Motor Corp., Buffalo, N. Y., maker of Stewart trucks, touring cars and roadsters, has opened a salesroom at 925-27 Main Street, Buffalo.

JAMES COUZENS, VICE PRESIDENT AND GENERAL MANAGER OF FORD MOTOR CO., RESIGNS

Resignation of Mr. Couzens, who has for years been the financial brains of the Ford Motor Co., comes as a shock to the trade. The reason for this step is on account of disagreements between Mr. Ford and Mr. Couzens on the Ford policy and public utterances concerning unpreparedness for war. Mr. Couzens said, "I disapproved of Mr. Ford's public utterances and it was of so serious moment to me that I at last decided to break relations with him." It is said Mr. Couzens will retain his financial interest in the company.

FOSS TO BE COMMERCIAL MANAGER OF PIERCE-ARROW BUFFALO BRANCH

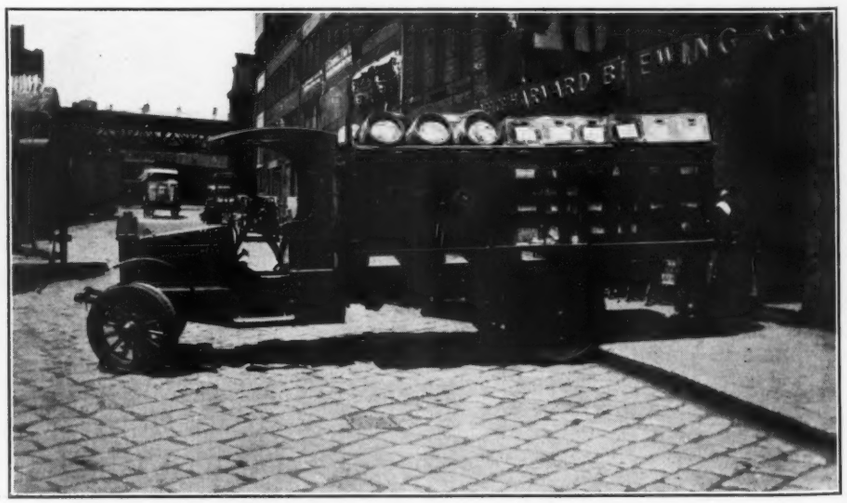
W. J. Foss, of Philadelphia, Pa., has been appointed to fill the newly created position of commercial manager of the Pierce-Arrow Motor Car Co., Buffalo, N. Y. He has been associated with the Pierce-Arrow for the last ten years as treasurer of the Foss-Hughes Co., distributer of Pierce-Arrow products in Philadelphia, Baltimore, Washington, Wilmington, Providence and New Port. He will have full charge of every commercial activity of the firm, including the selling of automobiles and trucks, advertising, publicity and service. He will work directly in association with Colonel Charles Clifton.

Acme Die Casting Corporation, Brooklyn, N. Y., has increased its capital from $125,000 to $200,000.

Ravenna Motor Truck Co., Ravenna, Ohio. Involuntary petition in bankruptcy has been filed, and C. C. Benner has been appointed receiver.

Randall-Miller Co., Boston, Mass., manufacturer of automobile accessories, has assigned for the benefit of its creditors to E. Dwight Fullerton.

Commercial Auto Body Co., St. Louis, Mo., has reduced the prices of bodies from $10 to $25. This reduction is made possible because of reduced manufacturing costs.



Truck Shows a Saving of Four Cents a Hundred on Suburban Hauls

This five-ton Pierce-Arrow truck is used by the Harvard Brewing Company, for deliveries from Boston to Lynn. In this service it is showing a saving of four cents a hundred over any other method of delivering. In addition to this saving, the company states that its customers are pleased with the better service, both in the delivery of full packages and in the handling of the empties.

The CCJ has most advertisers because it gives them biggest returns

THE MOTOR TRUCK AND THE CONTRACTOR

To the Editor:

Taking into careful consideration all of the many ideas that have been developed and brought into use for the economical work of the contractor and road builder, nothing in any way approaches or compares with the motor truck equipped with hoisting body. This has now been brought down to such a science that the stone or whatever material is being hauled can not only be placed on the road from either short or far distances in the quickest possible time and be dumped in fifteen to twenty seconds, but the connection between the hoisting body and the forward and reverse movements of the truck are so perfected that the material may be spread in any desired thickness at the same time it is being dumped.

Basing on actual results, observations and reports from our many customers, we have found that outside of cases where the owners overdid and thoroughly abused the proposition, that there has never been anything brought to their attention that makes such a tremendous saving in time and expense as the present equipment. We do not believe that this side of the question would be argued by anyone. The savings have come to a point where the average time in which you can positively pay the entire purchase price of a truck based on the difference between the cost of men and teams and the same amount of work done by the truck, is nine months. In other words, if the same payroll or expense that would have to be paid out to the owners of teams for hauling the road material a given length of time were paid on the purchase price of motor trucks to haul the same tonnage with an average of nine months the savings alone would pay for the investment. That would leave the owner of the trucks an opportunity to go over them during the winter months and these trucks would then cost him nothing for the next two or three years.

It is now a conceded fact that road contractors who have thoroughly equipped themselves with modern motor trucks with hoisting bodies, can bid lower to the extent of the cost of these trucks in obtaining a contract. Before we show the manufacturer's side, however, allow us to say that wherever you find a contractor whose experience has been otherwise than stated above, you can absolutely trace it to two causes—one, the inefficient methods that he has pursued in the managing of his motor trucks, and the other, the fact that he has purchased a cheap make of truck which has never been properly designed or built of the kind of material to stand the work for which it was intended.

The other side of the question which has never been brought out to my knowledge by any of the magazines, is the fact that so many road contractors, who want to take advantage of the tremendous saving, go to the manufacturer with most unreasonable requests. We will grant that they are led to believe by the many truck salesmen who will go to almost any extreme to sell their trucks, that these things can be brought about. Their idea is, in the first place, to get the price of these trucks down below the actual cost of their production, and then they insist that the manufacturer sell it to them on long time payments.

Now, let us see the other side. We manufacturers have been the pioneers to bring about this great evolution in transportation and our pioneer efforts have cut the roads that have made all this possible. These results have been brought about through the expenditure of vast sums of money and by many failures that have been costly. The present purchasers of trucks have never contributed one single dollar towards this large fund.

The building of our plants to produce these trucks has meant another large investment of cash. Our machinery has meant another large outlay of money and our materials must be paid for. Unless we take advantage of cash discounts we are unable to get our costs down to a point where we have a margin left for our efforts. Our payrolls have certainly to be paid for or we immediately go out of business, therefore the financing of our side of the question is a heavy one.

Now, after producing a piece of machinery that brings to the contractor tremendous profits, this wonderful chance at no extra investment at all, but simply the paying of what he spends in payrolls and pays out for teams upon which he never gets any returns turned into the payments for these trucks, the contractor, without any seeming thought of this side, tries to purchase and insists on buying these trucks on long time payments. In other words, asks the manufacturers to finance his business. If the prices are ever to be materially reduced it must be brought about by allowing the manufacturer to produce his goods on a less investment of actual cash.

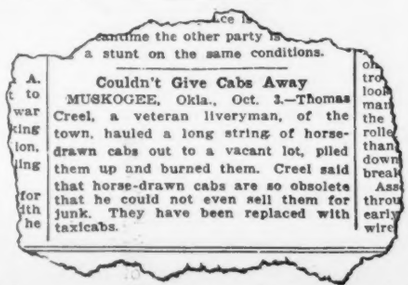
A contractor may say that it is impossible for him to put up the lump sum required for these trucks at one time, when he can spread out his payments for teams in payrolls extending over a period of nine months. However, he can get the advantage of a liberal cash discount by going to his banker and borrowing the money, making his arrangements to pay to the local banker the same amount of money every month that he would be paying out to teamsters. In that way his notes to the bank would be constantly reduced until they were finally wiped out without any effort on his part, and at the end of the time his truck would stand him nothing. The truck manufacturer would then be willing to give the truck to the contractor at a lower price, and through his bank able to obtain the cash on his payments, would be in a position to obtain his cash discount and thereby bring about a satisfactory arrangement to all concerned.

Don't forget that any truck manufacturer who offers you high grade dumping trucks on long terms and extremely low prices is usually in a position in which, through the inferiority of his product, he is compelled to go to these limits in order to sell his output, and that the customer in the end will pay dearly for what seems to him at the time an accommodation.

B. A. Gramm,
Vice-President and Gen. Mgr.,
The Gramm Bernstein Co.

Lima, Ohio

Gaston, Williams & Wigmore, Inc., 140 Broadway, New York City, exporters and importers, announce that their far eastern division, organized and equipped to develop markets for America's industries, will hereafter be in charge of Jos. J. Keegan and Hilliard J. Rosencrantz as their managing directors.


Ice is
carnine the other party is
a stunt on the same conditions.
Couldn't Give Cabs Away
MUSKOGEE, Okla., Oct. 3.—Thomas Creel, a veteran liveryman, of the town, hauled a long string of horse-drawn cabs out to a vacant lot, piled them up and burned them. Creel said that horse-drawn cabs are so obsolete that he could not even sell them for junk. They have been replaced with taxicabs.

Personal Items

Hugh Higgins, who has been employed as one of the government experts in the testing of automobile trucks, has been appointed representative of the Brown carburetor in the District of Columbia.

Harry Harding, brother of Jack Harding, has been transferred from the New York City branch of the Goodyear Tire & Rubber Co. to the Detroit branch, where he will be in the truck tire sales department.

Nelson T. Gutelius, formerly advertising manager of the Motor Car Equipment Co., New York City, has become advertising manager of the Emil Grossman Mfg. Co., Brooklyn, succeeding Alex Schalbach, resigned.

W. S. Mears, recently in the sales department of the Knox Motors Associates, New York City, and formerly with the Garford Co., is now sales manager of the Sternberg Motor Truck Co., 132d Street and 12th Avenue, New York City.

Reide B. Romig, well-known writer, has been elected general sales manager of the Kearns Motor Truck Co., Inc., Beavertown, Pa. He is planning a big national advertising campaign to be carried on under his direct supervision.

Theodore F. MacManus, of Detroit, a well-known advertising man, has joined the Erwin & Wasey Co., of Chicago, in the capacity of vice-president. He will be in charge of the Detroit office established by the company in the Kresge Building.

Edw. J. Maloney, formerly manager of the solid tire department of the Firestone New York branch, has been placed in complete charge of the sales in the New York territory of the Gibney Tire & Rubber Co., under the direct supervision of General Sales Manager C. A. Gilbert.

Robert Allan has been appointed district branch manager for northern California for the Burd High Compression Ring Co., Rockford, Ill. He was formerly attached to the Dallas (Tex.) branch. His headquarters will be at 847 Phelan Bldg., San Francisco, where he will carry a complete stock.

J. A. Inness, formerly manager of the Chase Philadelphia branch, succeeds F. B. Porter as manager of the Chase New York City branch. Mr. Porter, who has been the New York City branch manager for the Chase Co. for the past 9 years, is leaving the company to take up another line of work. C. E. Collard, formerly with the New York City office of the Chase organization, succeeds Mr. Inness as Philadelphia branch manager.

G. Earl Porter, chief engineer of the J. C. Wilson Co., Detroit, Mich., is completing a 2-ton model, which, it is expected, will be actively manufactured shortly. We stated in our last issue that Mr. Porter has just returned from a trip to the east in connection with the Russell Axle Co. This is incorrect. While on his trip he visited the Sheldon Axle Co., the Royal Equipment Co., and also the Russell Manufacturing Co., of Framingham, Mass.

Walter E. Holland has resigned his position as research engineer of the Anderson Electric Car Co., Detroit, to become a firm member of the Broadway Automobile Co., Inc., of Seattle, Wash., agent in the Northwest for Detroit Electric pleasure cars, Walker Balance Drive electric trucks, Elwell-Parker industrial trucks and Philadelphia Diamond Grid storage batteries, assuming the duties of secretary and treasurer.

San Francisco Auto Tour, Inc., San Francisco, Cal., capitalized at $25,000, has been organized for the purpose of furnishing general passenger and freight service.

The CCJ has most readers because it gives most information

Views of the Firemen's Parade and Fire Test, Taken During Convention Held in Philadelphia, October 4th to 7th

Some of the old-time hand engines were mounted on modern trucks for the parade. Athough the lower illustrations seem to portray scenes of a terrific fire, it was only a test of Philadelphia motor-driven fire apparatus. For details see page 8

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

THE COMMERCIAL CAR JOURNAL

Entered as second-class matter at the Post Office at Philadelphia, Pa. under the act of March 3, 1879

Vol. X. PHILADELPHIA, OCTOBER 15, 1915 No. 2

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets Philadelphia, U. S. A.

JAMES ARTMAN, President — C. A. MUSSELMAN, Treas. and Gen'l Mgr.
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ENGLAND'S REMOVAL OF DUTY ON AMERICAN TRUCKS WILL INDICATE THEIR VALUE TO NATION

IT was with some concern that American manufacturers, English agents for American firms, and many business men of England, learned of the placing of a 33 1-3 per cent. duty on American trucks and parts. Owing, however, to the immediate storm of protest, not by American manufacturers, but by those in England who have learned of the great value of the American truck to them at this particular time, the chancellor of the exchequer, Reginald McKenna, made commercial cars and their parts exempt.

The discussion over this matter has brought out very clearly that American trucks have been of the utmost advantage to the armies of England, and almost equally so to the great number of merchants in the larger cities whose motor equipment has been commandeered for military purposes.

Large numbers of agents, deprived of their English trucks, the output of the factories going directly to the front, have found the agency of American cars their only recourse.

That this duty would have been a hard blow to the American manufacturers is unquestioned. The point, however, which stands out prominently is the fact that although England is afraid that the influx of American trucks due to the war, will so establish them in the confidence of the people that they will form a strong competitor for English business at the close of the war, she does not, owing to the great need of the English people at this time for commercial cars, feel justified in virtually shutting out American competition as would be the case if the duty of 33 1-3 per cent. ad valorem were strictly enforced. This step indicates, however, that undoubtedly just as soon as conditions are relieved and the war draws to a close some such duty will be imposed to check the influx of American cars. Forewarned is forearmed, and American truck makers should plan their future course with this probable duty in view.

MODERN TRANSPORTATION AND DELIVERY NOW AN ENGINEER'S PROBLEM

THE evolution of transportation is a most interesting story. We have at last reached, we believe, one of the final stages in the development. The horse age of transportation is passing. We are now entering engineering or power age of transportation.

As yet, a comparatively small number of business men realize that this transition period is nearly consummated and they must suddenly wake up in the age of power transportation. Woe to those that still find themselves using the methods of the past age.

This change in transportation methods affects not only the city with its heavy hauling problems, but the country as well. It is the age of power and machinery, the horse has been outgrown, and his puny efforts are not up to the standards.

Delivery methods of modern business houses have been so reconstructed that no longer is this a subject for untrained subordinates, but is one which is receiving the most careful attention of the trained principals. It is now an engineering problem—Pat and his hostlers are relegated to the shanty and the stable of the unprogressive—while the clean, powerful gasoline or electrically driven machine or road engine handles the goods.

It is astonishing when one realizes how many business firms do not appreciate that this change has taken place, when one sees men apparently gifted with ordinary business acumen laboring with teaspoon instead of steam shovel, with wheelbarrow instead of truck, putting up with inefficient, slow plodding methods of transportation when modern facilities are at hand.

SIMPLIFIED CONTROLS FOR TRUCKS

Will they be necessary after the war?

No less a body than the American Society of Mechanical Engineers has been considering the question of "motion study for crippled soldiers," in other words, the question of providing machinery which can be operated by the 2,000,000 crippled men already produced by the European War is receiving attention. It is expected that large numbers of those who have been maimed in the war will come to this country. The thought arises, shall the control of trucks be simplified, and if so, how? The subject seems like a joke at the first glance, but there is no doubt that it will be a real problem to the manufacturers of Europe. Factory labor will be in demand, and there will probably be in the neighborhood of three million cripples upon whom will devolve a large part of the production of commodities.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

Steel and Rubber Markets

Rail Orders Coming in Fast

Rail business was the leading feature of the steel market during the past two weeks, although the steel shell business continued unabated in the same volume as it has for the past few months. Bridgework has also taken a decided jump. The demand for plates, shapes and bars continue active, with the leading mills asking 1.40c. Quotations on October 9th were:

STEEL PRODUCTS PRICES

Bessemer billets, per ton, mill	24 50 a 25 00
Open hearth, per ton, mill	25 00 a 26 00
Sheet bars, per ton	25 50 a 26 50
Forging billets, per ton, mill	33 00 a 34 00

The above prices are at tidewater, in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2 per ton additional is charged, and less than 1000 lbs., $8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots are $2 per ton higher:

Gage—	Black.	Galvanized.	Gage—	Black.	Galvanized.
Nos. 10 and 11—	1 65a1 75	2 50a2 65	Nos. 15 and 16	1 75a1 85	2 70a2 85
No. 12—	1 65a1 75	2 60a2 75	Nos. 17 to 21—	1 80a1 90	2 85a3 00
Nos. 13 and 14—	1 70a1 80	2 60a2 75	Nos. 22 and 24—	1 85a1 95	3 05a3 20

IRON AND STEEL AT PITTSBURGH

Bessemer iron, Valley furnace	16 00 a 16 25
Bessemer steel, f. o. b. Pittsburgh	24 50 a 25 00
Skelp, grooved steel	1 40 a ....
Sheared steel skelp	1 45 a ....
Skelp, grooved iron	1 75 a 1 80
Sheared iron skelp	1 85 a 1 90
Ferro-manganese (80 per cent.), seaboard	100 00 a ....
Steel, melting scrap	14 25 a 14 50
Steel bars	1 40 a ....
Black sheets, 28-gage	2 00 a 2 10
Galvanized sheets, 28-gage	3 50 a 3 60
Blue annealed, 10-gage	1 60 a 1 75
Tank plates, ¾ and heavier	1 40 a ....

Rubber Market Quiet

The price of up-river since our last report has been hovering between 55½ and 57½. Manufacturers are buying in small quantities for current consumption only. Quotations on October 9th were:

Para—	
Up-river, fine per lb	57 a57½
Up-river, coarse	43 a....
Islands, fine	50½a51
Islands, coarse	27 a....
Caucho ball, upper	44 a....
Caucho ball, lower	41 a41½
Cameta	29½a....
Ceylon—	
First latex pale crepe	62½a....
Smoked sheets	62½a....
Sheets and biscuits	58 a58½
Centrals—	
Corinto	40 a41
Esmeralda	40½a....
Mexican scrap	38½a39
Guayule	30 a31
Balata, sheet	54 a56
Balata, block	39 a40
African—	
Massai, red	52½a53

DOMESTIC SCRAP RUBBER

Inner tubes, No. 2	11½ a 12
Tires—	
Automobile	4¾ a ....
Bicycle, pneumatic	3 a 3¼
Wagon and carriage, solid	4½ a ....
Inner tubes, No. 1	25 a 26
Inner tubes, No. 2	11½ a 12

MOTOR FIRE APPARATUS MAKES IMPRESSIVE SHOWING DURING PHILADELPHIA CONVENTION

THE thirty-sixth annual convention of the State Firemen's Association of Pennsylvania was held in Philadelphia, October 4th to 7th. On the afternoon of the 6th, a test of local apparatus was held for the benefit of the visiting firemen. The affair presented quite an unusual spectacle and fully convinced the onlookers of the superior service rendered by the high pressure fire system which is maintained in the business or central section of Philadelphia.

The test took place on the north side of the City Hall, and lasted about an hour. Promptly at 2.30 an alarm was sounded in various fire houses. A few minutes later hose-carts, hook and ladders, aerial apparatus, and a few horse-drawn pumps rounded the corner of City Hall square at top speed. The object was to show speed in getting to a fire and also how quickly the apparatus could be put into working condition. In less time than it takes to tell it, the pumps were throbbing, and sending columns of water high into the air. One of the prettiest sights occurred when six streams of water were directed toward Arch Street, fully a square away, and formed a veritable sheet of water as wide as Broad Street. During this display over 12,000 gallons of water were delivered per minute. The aerial trucks and hook and ladders gave a fine exhibition of altitude work.

On the 7th, the firemen's parade was held, which was witnessed by great crowds that lined both sides of Broad Street from Montgomery Avenue to Wharton Street. There were about 5000 men in line and equipment showing the development of fire fighting apparatus for nearly 250 years. Everything from old-fashioned hand engines to modern motor-driven apparatus were in line. Some of the old relics were too old to run on their own wheels, so were mounted on suitably decorated trucks. These trucks were loaned for the purpose by these Philadelphia representatives: 2-ton Kelly-Springfield; 1½-ton Garford; semi-Knox tractor; 3-ton Packard; 2-ton Commercial Electric, and an Autocar. Very few towns of any size in Pennsylvania were not represented, and the apparatus and gay uniforms combined in a picture which was even more quaintly interesting than many had anticipated. It was also most interesting to note that the many representations from small towns were fully motor equipped. The Old York Road Fire Co., of Ashbourne, was awarded the $100 prize for the finest motor-driven apparatus for active service in line.

NEW DEPARTURE PREPARES FOR EXTENSIVE BUSINESS

One of the most remarkable instances of expansion of manufacture in the automobile industry is the present day growth of the New Departure Mfg. Co., of Bristol, Conn., makers of the "American made for American Trade" New Departure ball bearings. This company is now erecting extensive additions to its big ten-acre plant, and installing machinery that will enable it to double its present production.

While it is true that the European war has practically eliminated the foreign made ball bearing from the American market, and has therefore influenced to some degree this remarkable development, it is also true that permanence of increased volume of business of the company is assured by reason of the fact that this home-made ball bearing is equal to the best of the foreign product. The well-known conservative management of the company would hardly expend large extraordinary sums for temporary use. Furthermore, this company is not making war materials. The doubling of its capacity is due to large contracts secured before the war influence was felt in this country.

With its enlarged plant, the New Departure Co. will, in a few months, have facilities for meeting the American demand satisfactorily. There is in process of construction now at Bristol what will be the largest building specially designed and equipped for grinding purposes in the world. The machinery to be installed will be of the very latest type, and in most instances, specially designed by the company's engineers who have specialized on ball bearing quality, as well as quantity production.

Another important extension will be that of the largest of its heat-treating buildings. This building, when completed, will contain two hundred and thirty oil fired furnaces, specially designed by the company's experts. Supplementary to the furnaces themselves, will be a new arrangement of the quenching vats and the operation of a liquefied ammonia gas refrigerating system, which will greatly increase the amount of work per furnace, and hold the processing of the steel to practically perfect uniform quality. It may be said in passing that this mammoth heat-treating building will also be the largest employed in the manufacture of anti-friction bearings. Other departments will be increased correspondingly, so that the present twenty-three hour per diem production capacity will be doubled.

The CCJ leads in circulation, advertising and prestige

Commercial Car Efficiency Increased by Auxiliary Equipment

Manual Handling of Material Eliminated by Curtis Publishing Company by Mechanical Devices Used With Trucks

By E. S. FOLJAMBE

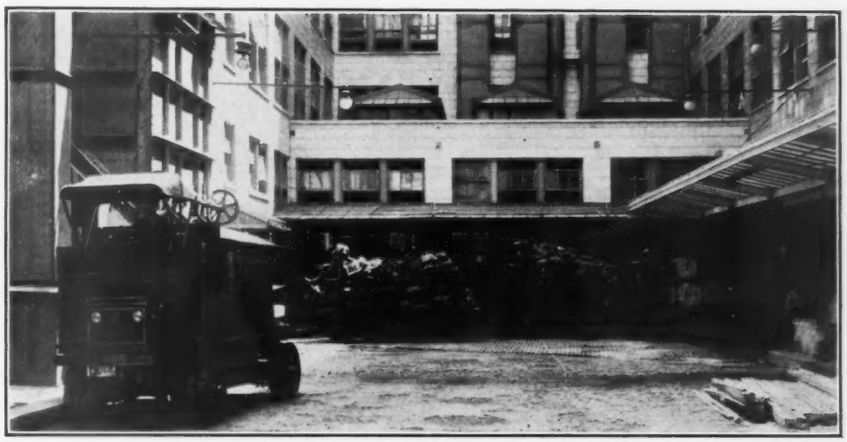
ONE of the best examples of increased efficiency, and acceleration of truck delivery by mechanical auxiliary devices is the installation of the Curtis Publishing Co., Philadelphia, well-known publishers of the Ladies' Home Journal, Saturday Evening Post, The Country Gentleman. The entire incoming and outgoing freight and mail of this enormous publishing house is handled by mechanical devices, there being no horses whatever in the service. The first of the fleet, which now consists of ten large and two small electric trucks of the Commercial Truck Co., of America, Philadelphia, was purchased in August, 1912, previous to which time the hauling was done by horses under contract with outside parties.

The installation is unique in three principal respects; namely, that it is all electric, that all loading and unloading is done by mechanical means, and that the hauls are through the congested districts and over distances not more than one and a quarter miles. It may also be said that the hauls are to docks and railroad stations as well as being short hauls. Both of these are conditions under which it has been claimed trucks cannot show efficiency over horses. It goes without saying that E. Hunn, Jr., the purchasing agent of the company, did not invest $100,000 in buildings and equipment without first convincing himself that the returns on the investment would warrant same.

Although horse delivery was in a way satisfactory, and the important shipments of the various publications to the railroad and steamship lines were never held up, still he believed a saving could be effected by a proper installation of their own trucks. Results have shown that this saving has been possible, and that even a further saving and increased efficiency resulted from the introduction of mechanical loading and unloading devices, the using of removable bodies, chutes, etc.

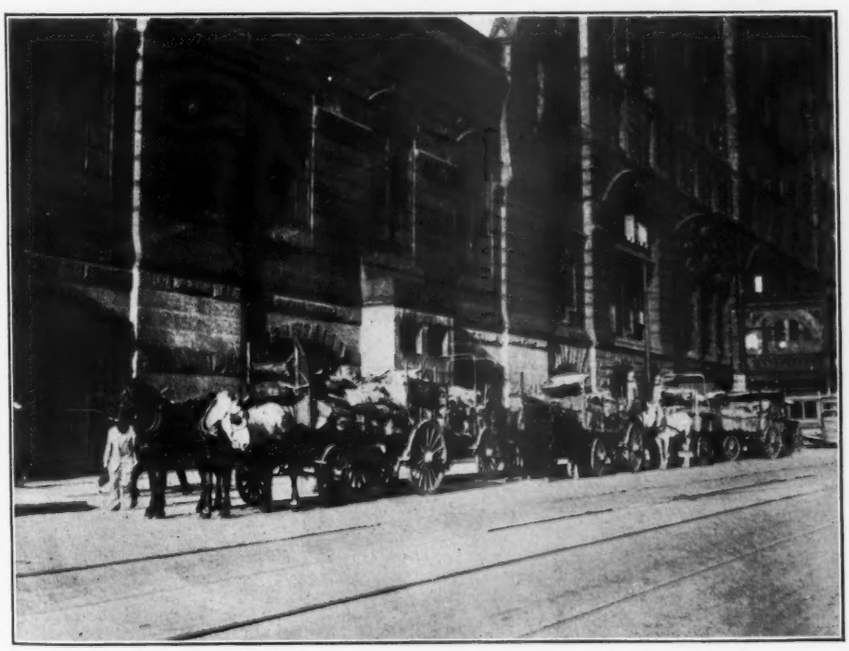
Gain of Seven Thousand Pounds Per Vehicle Per Day Due to Mechanical Devices

In a ten-hour day, seven loads used to constitute the average day's work for each vehicle. Electric cranes on overhead I-beams resulted in an average of nine loads per vehicle per day, or an average gain of 7000 lbs. per vehicle per day, a gain that is even greater than this during rush spells when the vehicles are worked twelve and fourteen hours a day.



Courtyard of the Curtis Publishing Company

This photograph is interesting, as it shows in one group the various types of hauling of the company; namely, coal, the mail in bags, and at the right, the paper in rolls



Congestion on Market Street When Horses Were Used

This line of horse trucks waiting their turn to deliver the bags of mail was a common occurrence before the Curtis Publishing Company motorized its equipment

What the Trucks Are Doing

Briefly, the work which this electric fleet is accomplishing is the hauling of rolls of paper from the company's warehouse at 11th and Washington Ave., to the plant at Independance Square, a distance of one and one tenth miles, the hauling of bags of mail from the plant to the railroad station, post office, and Delaware River wharves, the carrying of baled waste paper from the plant to the warehouse, and coal from the warehouse to the plant. The ashes are also carted off under contract. The coal hauling was formerly sublet to contractors, but since the adoption of electric trucks and the installing of two side delivery, hopper type, steel bodies, interchangeable with platform stake bodies, all of this work has been done by the same vehicles that at other times carry paper and mail. As a rule, the one 7-ton truck and the 5-ton trucks of the fleet are used for carrying the paper rolls from the warehouse to the plant, and returning with paper waste and cores, which, by the way, makes the performance of the 7-ton truck unusually effective, as it is under load almost ninety per cent. of its working time. The four 3½-ton trucks are ordinarily employed in handling the mail, that is up to their capacity, and then the 5-ton trucks

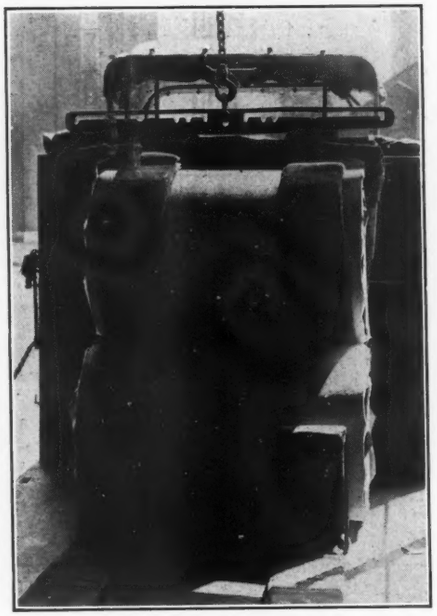
The CCJ has most advertisers because it gives them biggest returns

are also used. Some idea of what this means can be had from the fact that there are 160 tons passing out from the Curtis Publishing Co. each day. The smaller vehicles are used for miscellaneous hauling, such as office supplies, ink, etc., and other purchases, also for odd material from the railroad yards, occasional loads of empty government mailing bags, etc. One of these trucks is now being dispensed with, and will be replaced by another C. T. truck of 3½ tons capacity, which will make a fleet of eleven large and one small truck.

Mechanical Loading Better

Although rolls of paper weighing from 1200 lbs. to 1650 lbs. apiece can be handled without mechanical aid, the use of electrical hoists on overhead trolleys has been found better. There is very much less damage to the paper. At the end of the day, when hand loading, the men when tired, do not work at the same speed as in the morning, but with the electric hoists it makes no difference what the time of day may be, as much being accomplished at closing time as early in the morning.

Each roll is protected not only by heavy paper coverings, but while being handled by a heavy padded canvas cover, as shown in the accompanying illustrations, the question of damaging the rolls is more important than may be realized by one not familiar with the subject as shown by the following incidents: As the writer was passing through a portion of the storage floor these rolls were being unwrapped. There was a small tear extending for an inch or more into the edge of one of the rolls, and this was instantly noticed by Mr. E. J. Hancock, manager of the warehouse and trucking department. "That little tear will probably result in the loss of 100 lbs." he remarked. The damaged layers were immediately removed and weighed, tipping the scales at 102 lbs., and this was a loss due to a very small cut into the edge of one roll. From this it can be seen that the greatest of care must be exercised in paper handling.



Roll of Paper Just Before Its Removal From the Truck

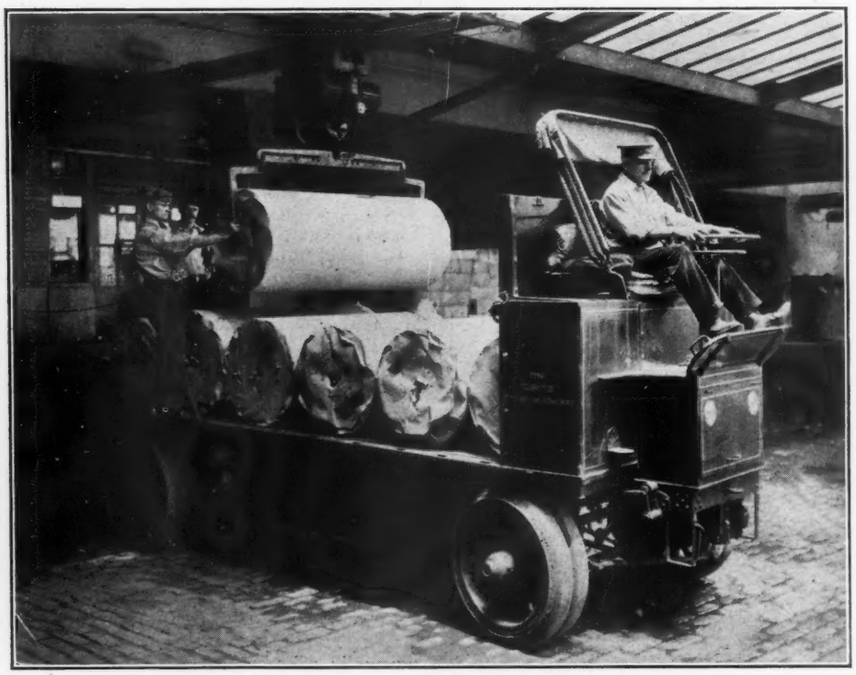
Showing the careful manner in which the rolls are protected and cushioned from each other; the adjustable width hook from the electric hoist is also shown. Out of approximately eight million pounds of paper handled only one thousand pounds are damaged.

At 7.30 in the morning, the trucks leave the Curtis garage, and take on their loads for the main plant. The garage is in this location rather than at the main building, because of the fact that each morning this paper has to be hauled from the warehouse. Having the garage and warehouse together results in saving of the time of the vehicles and incidentally in utilizing property of considerably less value per sq. ft. than that on which the beautiful, and one may say famous, building of the Curtis Publishing Co. in the center of the city, is located.

Mechanically Equipped Warehouse

The paper comes directly from the Pennsylvania Railroad spur into the enormous brick faced concrete and steel warehouse, eight carloads at a time, five cars on one spur and three on the other, being accommodated within the first floor. The unloading platform for these cars is on a level with the floor of the cars. The mechanical equipment at this point for unloading consists of a heavy I-beam which acts as a track for a one-ton wheel operated hoist. This I-beam carrying the hoist, which is movable along it, is in turn suspended from a double I-beam track above, running the whole length of the platform parallel to the cars. It is not only supported, but swivelly supported, so that it can be placed parallel to the railroad car, or run directly through the side doors of the car at right angles to its length. In this position it is shown in one of the illustrations. The crane is run into the car and with its adjustable width hook, for the rolls of paper are of different lengths, varying from 23 to 67 in. wide, it picks up the roll which is then pushed along and lowered on to a small hand truck to be placed in any desired position on the floor. In this way from twelve to fourteen railroad cars are unloaded per day, as the plant uses some 200 tons of paper every twenty-four hours. In the upper floors there are stored approximately 16,000 rolls of paper, or three months' supply.

The paper as required for the presses is loaded on the trucks by means of a Yale & Towne hoist, the ends of the hook engaging the hollow metal core or pipe on which the rolls are wound. A complete load of 7 tons can thus be placed on the truck in from ten to fourteen minutes, according to the size of the rolls, the larger rolls taking less time as fewer have to be handled. Upon arrival at the plant the truck enters a hollow square or court in the middle of the building, backs to its platform in which position it is protected by a glass roof, and the paper is again lifted directly by electric cranes on overhead trolley and lowered to the storage floor of the main building through openings in the platform directly back of the trucks. It is noticeable that not only are the rolls protected by canvas wrappings, but even the edges of the openings through the floor, to minimize paper loss due to abrasions. This unloading including the placing of the material directly on the storage floor below can be done by the driver and the helper in approximately ten minutes, so that the loading and unloading is thus handled in less than twenty-five minutes, or about one-third of the total time consumed in a single round trip. Hand loading would more than double this loading and unloading time, to say nothing of increasing the per cent. of damaged paper. On the same platform and bound



Overhead Electric Hoist Handling Sixteen Hundred Pound Roll of Paper

The seven-ton truck can be unloaded and the paper placed directly on the sub-basement or storage floor, by a man and helper, in ten minutes by means of this unloading device

by a removable chain with turnbuckle is baled waste paper cuttings, or damaged flat sheets, each bale weighing 2400 lbs. Each bale is on an individual wooden platform with stake sides. These are raised by means of Cowan hydraulic lifting hand trucks and rolled on to the commercial cars, which thus return loaded to the warehouse, a maximum efficiency performance.

The entire side of the first floor of the warehouse is cut under, forming a loading place, so that the entire fleet can be loaded at one time if desired, without any of the vehicles projecting into the street.

Coal From Railroad to Boiler by Mechanical Means

The trucks form but one link in the mechanical chain by which 12,000 tons of coal per year used by the plant are handled. The completeness of the mechanical equipment makes the installation interesting.

Bottom dump coal cars, as shown in the accompanying illustration, chute the coal directly beneath them through gratings on to a traveling conveyor, which in turn dumps the coal on to a horizontally and vertically moving bucket conveyor, which carries the coal upward, discharging it into the overhead hoppers from which the trucks are loaded. This same conveyor also passes the coal to a distributing conveyor above the coal pockets, thus building up a small mountain of coal. At the time of this writing the coal retaining walls were built up by auxiliary palings, and contained from 12,000 to 13,000 tons.

Coal is hauled when the 5-ton trucks are not otherwise engaged. Two removable coal bodies are suspended from the four corners by chains and hooks on differential chain blocks in the garage. These are lowered upon the truck chassis when needed and thus saved buying coal trucks. Much of the coal hauling is done at night and the machines have handled as high as 60 tons on a single charge. An accompanying illustration shows one of these trucks just leaving the coal pocket after being loaded by gravity from the overhead chute. The trucks deliver the coal by gravity to a grating in the courtyard, where it is moved by conveyor to the fifth floor of the building and passes by gravity downward through measuring hoppers directly on to the floor in front of each of the furnaces. Here the first hand handling is to distribute it over the furnace grates. It will be seen that gravity is used wherever possible to facilitate the work.

Removable Bodies and Trucks Facilitate Mail Handling

The Curtis publications, as is well known, reach the various parts of the United States at the same time. In order to make this possible, shipments for various sections must go out of the plant on schedule time in order to connect with the mail trains and boats. To assist the post office and save delays, the mail is routed in the shipping department of the Curtis Publishing Co., so that when it reaches New York City and other large cities it can be placed directly on trucks for distribution. Government post office men are in attendance and check the weighing

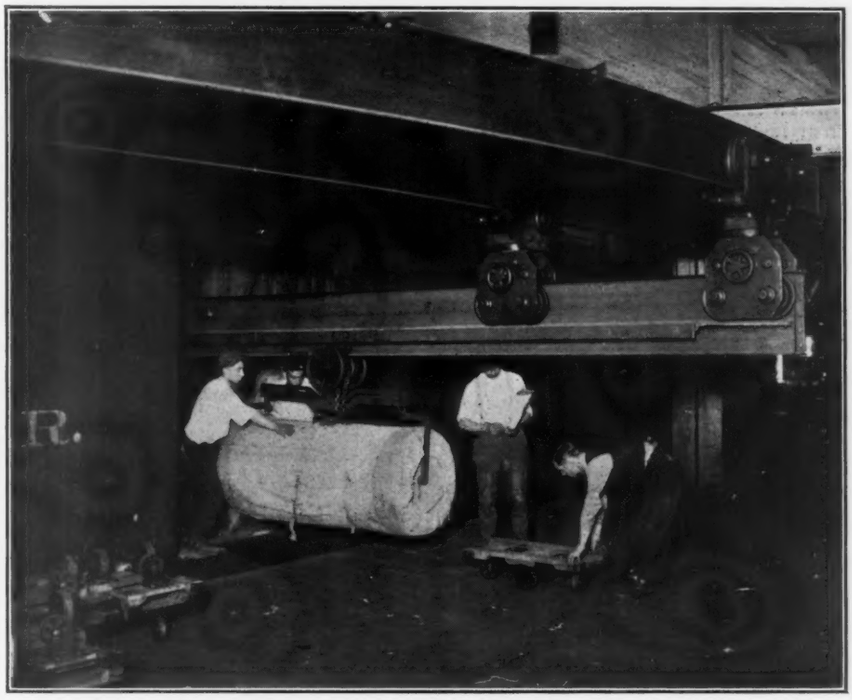
All Steel Demountable Coal Body Filled From Overhead Coal Pockets

These C. T. Electrics are largely used for coal hauling at night, and fitted with stake bodies for mail hauling in the daytime

of all outgoing mail directly at the plant. From the time the magazines leave the presses throughout the entire plant, mechanical devices are employed for facilitating and speeding up their movement. There are overhead belts, floor conveyors, spiral chutes, until the bags of mail reach the outgoing loading platform on the Sansom Street side of the building. Here are suspended with tailboards to the platform the removable stake bodies for the trucks. As the same size platform stake body is employed on both the 3½- and 5-ton trucks, the loads simply being higher for the larger vehicle, the bodies are so suspended that they will come centrally on the large truck chassis when its tailboard touches the edge of the platform. This leaves a small space between the suspended body and the platform, which, when the body is being loaded, is bridged by sheet steel. The truck backs directly to the platform, and the 8-ton triplex hoist, of Yale and Towne manufacture, lifts the body by means of hooks and chains, raising it about 3 in. from the truck platform so that the truck can drive from under it, and be backed directly under the suspended and already loaded body, as shown in the accompanying illustration. For maintaining the body in position, iron pegs protrude from the four corners of the truck platform straddling the removable platform channel frame structure, thus preventing it from side movement. These same projections engage the forward and back edges of stake pockets, so that there can be no fore and aft shifting of the bodies. This is all done automatically by merely lowering the body into position. The driver and helper operating the chain blocks, require but from two to three minutes from the time the truck backs to the platform until they have it on its way loaded. A 14-in. slanting curb is provided as a stop for the rear wheels of the trucks.

Newly Installed Removable Body and Overhead Hoist System at the Pennsylvania Railroad

That the railroads appreciate the advantages of the use of mechanical unloading devices as time saving for the owner and also for themselves is shown by the fact

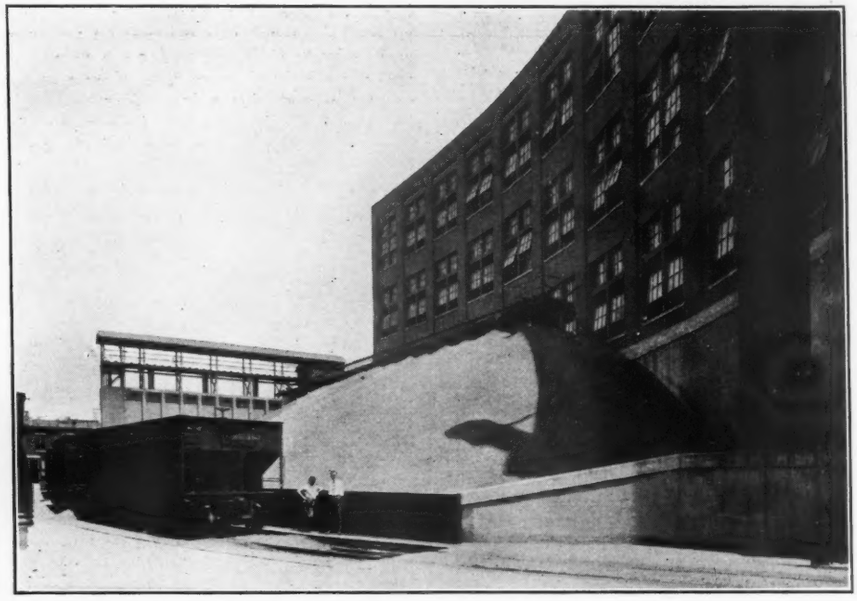


Movable Arm Trolley Hoist Unloading Train Within the Warehouse

This arm can be swung in any desired direction parallel to or at right angles to the car by means of its overhead trolley supports

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

that the Curtis Publishing Co., by special arrangement with the Pennsylvania Railroad, has now installed at Broad Street Station at 15th and Market Streets, the same system of triplex hoists and removable bodies as used in its plant. No sooner does a loaded truck back in, than its loaded body is swung clear, it backs under the empty body, and is on its return trip with the least possible delay, leaving the mail men to unload the body at their leisure. In a small cut is shown the line of horse vehicles waiting at this same point to deliver mail when the old-horse method was employed. There is now no such congestion.



Twelve Thousand Tons of Coal Mechanically Handled

This shows the enormous pile of coal at the warehouse of the Curtis Publishing Company. The cars at the left are chuting the coal through grates below the tracks on to conveyors, which carry it to the overhead coal pockets, from which the trucks are loaded by gravity through chutes. The building at the right is the enormous warehouse constructed on a curve, to fit the railroad.

With the old method it used to take from 15 to 40 minutes to load. Now the truck slips out from under its unloaded body, takes on the loaded one, goes from the plant to the railroad at 15th and Market Streets, drops the loaded body, and returns with an empty one in about 35 minutes.

As is usually the case, the use of demountable bodies is equivalent to an increase in loading space. In this instance it was impossible for the trucks to back into the space directly behind the large supporting columns at the sides of the building. The bodies, however, hanging from their overhead trolleys can be moved into these spaces for loading, reserving the rest of the platform where it is more easy of access for the trucks. This virtually increases the loading platform by the width of a truck body behind each post.

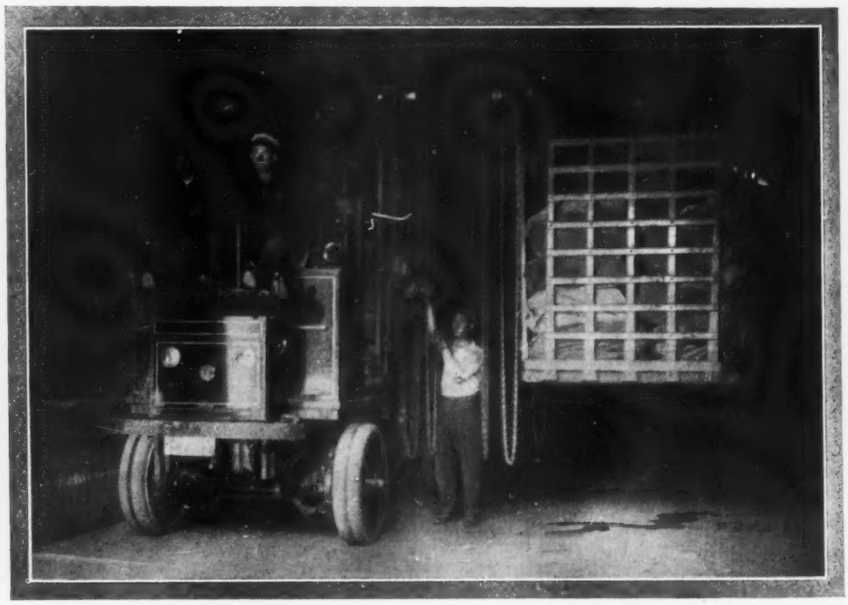
Phenomenal Showing Made By Delivery System During Stormy Weather

The efficiency of the delivery equipment was shown just preceding and during the unusual blizzard last year when, on March 2d, there was a snow fall of over 22½ in. The coal hauling contractor having falling down on the job, a single 5-ton truck was put on at 7 a.m. on the morning of the 21st, and as snow was then falling and the blizzard predicted, this truck worked continuously for 48 hours, or until 7 a.m. on the 23rd by shifting drivers and batteries every six hours. This one truck during this run handled 244 tons. On Monday, the morning of the blizzard, 464 tons were handled; on Tuesday. 530; on Wednesday. 505; on Thursday, 487; on Friday, 359. This was a short day as the men were allowed to go home early to rest, knowing that there was a big day in store on Saturday. On this day, the 7th of March, with the snow still deep on the ground, the largest haul ever made by the company was accomplished—532 tons of paper, including paper waste and cores, mail and freight, 118 tons, of miscellaneous matter, such as mail bags, ink and packages incoming, 11 tons, or a total of 661 tons in one day, the trucks being on the road 17 hours.

The Columnless Garage

The garage in which the trucks are cared for, as before stated, is close to the warehouse where land is comparatively cheap, on Kimball Street, between 10th and 11th, and where the trucks have to run simply around the corner to get their first load in the morning on their way to the main plant. It is 124 ft. long, has a sawtooth roof, making the garage very brilliant in every part, and is without a column of any kind for roof support. Special trusses are used for this purpose, giving an absolutely clear floor space. The garage has a capacity of about 36 vehicles, and is complete in every detail, including not only the usual features, such as well-appointed machine repair shop, battery room with charging panels, but also a stock room, furnace room, and even a washroom for the men, including shower baths. The furnace room supplies heat for the various rooms beside the main floor, and maintains a uniform temperature on the main floor of about 40 degrees or over. A 400-gal. water heater insures plenty of water for the washroom. Here a mixing tank is used insuring a uniform temperature for the water applied to the vehicles.

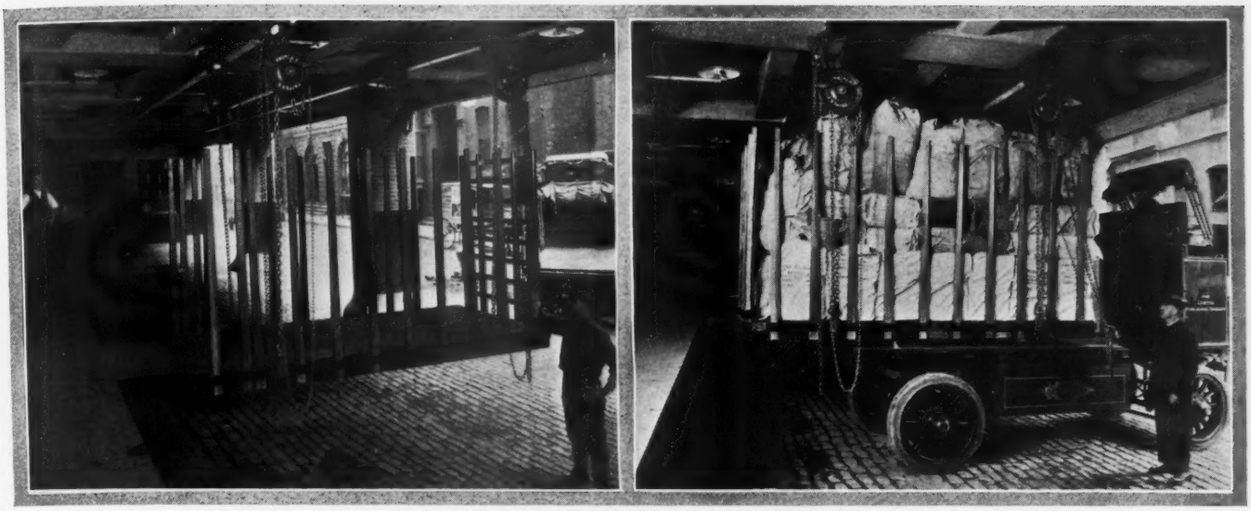
There are several novel features; for instance, in each of the four corners of the washroom close to the floor is installed, with heavy bunkers to protect it, an automobile headlight. This insures almost a shadowless light for the washroom. The charging plugs, instead of being



Mail Truck Delivering Demountable Body at the Pennsylvania Railroad Station

The truck backs under the Yale & Towne hoist, the attendant raises the body about four inches, the machine draws out and is backed under the empty body, and is on its way again in less than five minutes.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?



Demountable Stake Platform Bodies on Eight-Ton Hoists

By means of these bodies the space back of the large posts was utilized and an increase in loading and unloading speed is effected, bringing about a gain of seven thousand pounds per vehicle per day over ordinary hand loading

kicked around the floor at the end of their cables, are each neatly suspended upon the wall by counterbalancing weights, so that they do not become rusted or battered. They are so arranged that if a driver accidentally starts up his vehicle while the plug is still in, the angle of pull is such that the plug comes out without damage. To prevent accidental backing of the trucks against the walls or partitions, heavy bumpers with one edge beveled are placed loosely on the floor at the desired distance from the wall. These act as a warning and a flexible automatic stop when backed into. Cowan hydraulic hand trucks are used for handling the batteries, and permit the raising or lowering of the battery to exactly the battery compartment height, thus facilitating battery handling. There are individual charging circuits to each vehicle, the current being supplied by a 600 amperes 125 K.W. motor generator.

The efficiency of the garaging facilities and repair department is shown by the fact that the trucks have only twice been laid up more than two hours when needed.

Truck Loading From Freight Cars Fitted With "Rapid Loaders"

Of auxiliary equipment to assist in increasing truck efficiency, devices which permit of rapid loading from freight cars are very important, especially to contractors and those handling material daily from the yards. Illustrations herewith show the Rapid Loader made by the Bonney Supply Co., of 371 St. Paul Street, Rochester, N. Y. They are suitable for handling sand, gravel, crushed stone, coal, coke, cinders and other similar material, and are used not only with railroad cars to the sides of which they can be quickly and rapidly clamped, but also in gravel beds, coalyards, etc.

These loaders, when used with freight cars, are usually hand-loaded by men in the cars while the truck is delivering. Upon its return the loader is tipped, discharging its contents into the truck, resuming its normal position again immediately by gravity. There is practically no waste on the ground as when hand shoveling from the car into the truck, consequently no time wasted in scraping up the overflow.

Contractors Gaffey & Burns, using these loaders on the New York State Highway work, at Holcomb, N. Y., were enabled to reduce the round-trip time per truck from 1 hour and 30 minutes to 1 hour. Five-ton trucks were used, and an increase in deliveries of practically 50 per cent. was made possible.

Movable Canvas Chutes as Overhead Loading Devices

A simple but very effective method of loading from the second story is by the use of a collapsible canvas tube which hangs limply against the side of the building when not in use. When required, its lower end is attached to the truck body, the upper end being permanently attached to the frame of the opening, whether this be a window or a permanent opening in the wall for the purpose. This is largely used for mail bags and other material which is not too heavy, the goods being carried in this way across the sidewalk and into the truck without obstructing the sidewalk. It does away with elevators, hand trucks and the several handlings usually required.

The Federal Printing Co., 231-249 W. 39th Street, New York City, who employ a 1-ton G.V. truck, have found this method very advantageous.

Curtis Publishing Company's Columnless Garage

The garage roof is of sawtooth construction, supported entirely by braces, giving a clear floor space capable of housing thirty-six trucks. Automobile headlights are mounted in protecting bunkers at each corner of the washroom. Charging plugs are held up off the floor by counterbalanced weights. The garage equipment is complete in every detail, including shower baths for the drivers.

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An areaway within the building is a feature designed especially for the purpose of using trucks. This is served by two 1000-lb. capacity Triplex Blocks on overhead I-beams. The runway is cut from the sidewalk line, backward into the platform, and is 8 ft. wide, which is ample for the truck, but it is claimed that 9 ft. would be a better width, as occasionally three-horse wagons are also used. These wide-hubbed wagons sometimes get stuck, and the overhead tackle is found convenient in extracting them as well as when moving heavy packing cases, etc.

The printing plant is so arranged that the raw material does not in any point double on itself, but travels on a progressive course through the various operations until it comes out as the finished product, when it is shot into the vehicle by the canvas route.

The Charles Schweinler Press, at Morton and Washington Streets, New York City, also employs a similar canvas chute.

Hoists Efficient in Lumber Yard

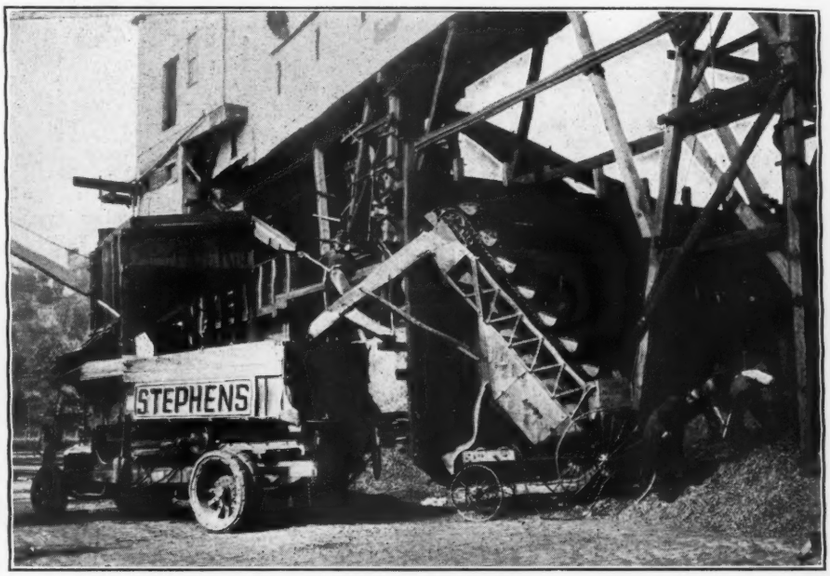
In no way is the efficiency of the commercial car more reduced than by delays in loading and unloading. In the lumber yard where mixed loads, including building materials, etc., are daily being handled, the time required to make up such loads is so great that it does not pay to keep a truck waiting. In such cases removable platforms upon which the loads can be made up while swung from overhead cranes, are of the greatest advantage. Such an installation of Yale & Towne Triplex Blocks, is in use by the Paten & Davies Lumber Co., of Los Angeles, Cal. The mixed load is made up while the truck is delivering a similar one, and the load is ready for it when it returns. It requires but a very few minutes for the truck to back under and be off again, as compared with an hour or more with older methods.

Coal-Handling Devices

Coal has always been a ready subject for mechanical handling devices. Overhead loading is quite common and has been in use for many years. Coal pockets of large capacity with chutes which can be controlled by the drivers are in use by most of the coal companies, others prefer a loading hopper of less capacity served by clam-shell buckets in connection with mast and gaff rig. In the accompanying illustrations are shown some of Roderick J. Stephen's trucks, of New York City. One of these, a 6½-ton Sauer, is shown loading under a hopper.

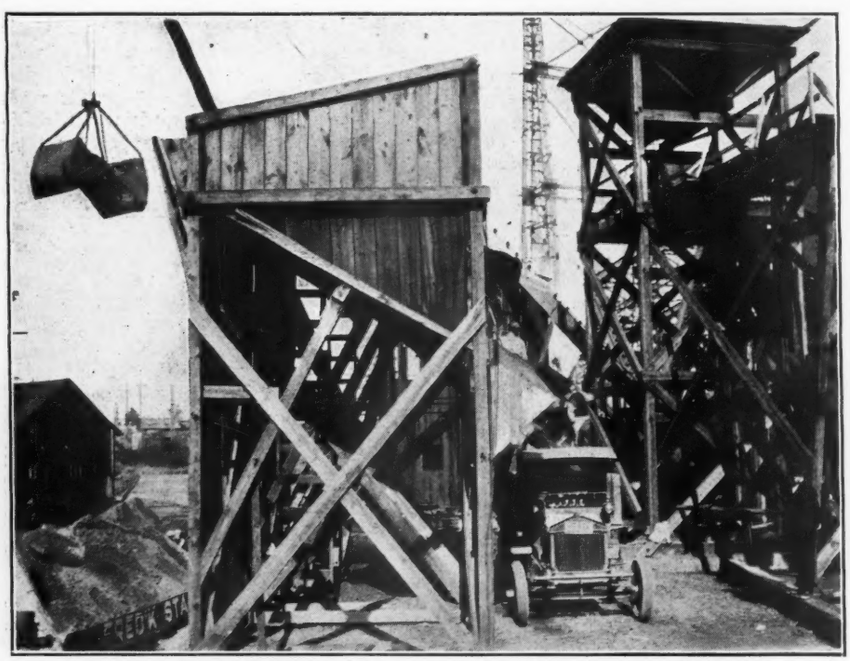
Special Device for Loading Directly From the Pile

An electric loading device, as shown in the accompanying illustration, is used in the Roderick Stephen's yards, and in several of the large yards throughout the country. The one illustrated is a movable automatic loader, power being provided by an electric generator connected with cable to sockets conveniently placed at various points in the yard. It is started and stopped by means of an ordinary switch, and by means of its buckets discharges its load through a screen, 3 ft. wide and 5 ft. long, directly into the truck. With some piles of certain grades of coal the buckets can be made to scoop directly into the pile, while with others men are required to shovel into the buckets, but even under the latter conditions it only requires six minutes to fully load a 6-ton truck.



Movable Coal-Handling Device. Loads Six and One-Half Tons From Pile in Six Minutes

This device consists of chain and buckets operated by electric generator with current through cable from sockets suitably located in the yard. The coal is screened before entering the body



Loading Hopper Device in Connection With Mast and Gaff Rig

This method of loading represents a very satisfactory way of handling a large tonnage at a minimum of expense and space. The time consumed in loading motor trucks from such a hopper is less than any other method.

Gravity Conveyors, Chutes, Etc.

Mechanical conveyors of various forms are rapidly being introduced as adjuncts to the delivery system. Goods of almost any character, ranging from bulky packing cases to individual bottles, can be handled rapidly and economically by gravity, there being practically no expense whatever except the slight cost of maintaining the equipment. A large line of such devices is being marketed by the Mathews Gravity Carrier Co., Elwood City, Pa.

In one of the accompanying illustrations a double thread, spiral chute is shown. This is constructed of ten and twelve gage sheet metal, reinforced with heavy angle irons, and at each floor fitted with counterweighted fire doors, suspended by fusible links. By means of these chutes goods are almost instantly transferred from any floor of the building directly to the checking and loading platform.

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Gravity Roller Conveyors

Mathews' gravity roller conveyors of all steel construction, with ball-bearing rollers, are another great aid in bringing goods economically and without loss of time directly to the loading platform. These roller conveyors are made up in 8 ft. sections, and can be fitted with legs provided with castors, each section forming a separate unit so that they can be within a very few minutes disassembled and reassembled again, forming a conveying line to any desired point. The angle necessary for motion is so very slight that it is hardly noticeable, and lengths of 200 ft. to 300 ft. are quite common. There are curved sections, and although as a rule these are without side railings of any kind, boxes, barrels, baskets and all kinds of goods roll along under the action of gravity at a uniform rate without falling off. In our illustration we show one of these conveyors carrying goods from the checking and shipping room directly through the door onto a loading platform.

The handling of brick and tile directly from the yard to the vehicle on which they are to be loaded, either freight car or trucks, is easily accomplished. Operators take two bricks in each hand, slap them together on the conveyor and the bricks travel in groups of four directly to the body of the truck. Where the conveyor is a long one, and therefore is lower at the point of discharge than the body of the truck, a special elevating device, as herewith illustrated, is supplied, operated by a very small electric motor. This device can be raised or lowered in a minute to the desired height.

Occasionally, a means of transferring packages directly from a second or third story to a loading platform or yard is desired. For this purpose an open work chute made of metal strips which will not collect snow, and will stand the weather, is used.

Openwork Gravity Conveyor

To be used from upper stories across buildings or vacant lots directly to the loading yard, where it can be arranged at the proper height for truck loading.

Spiral Metal Conveyor

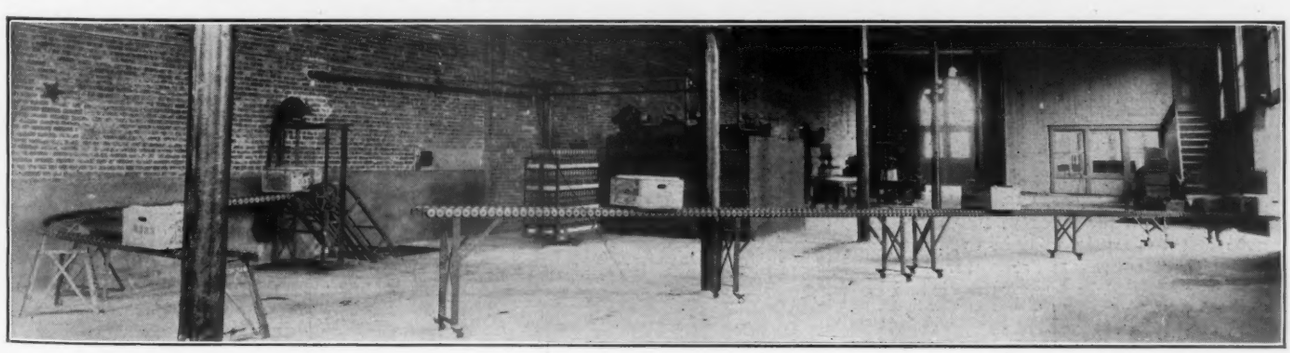
This conveyor also operates by gravity, is made of sheet metal, the one in the illustration being divided at the lower end, giving two points of exit. One side can be used for boxes and heavy goods and the other for baskets and lighter material.

Roller Skid

This company is also putting out another type of the Mathews conveyor which is a metal skid for loading vehicles, the skid being provided with steel ball-bearing rollers at the sides, making it easy to roll heavy cases, barrels, etc., from the ground to the truck body. The other side of it forms an ordinary metal skid. On the loading platform with the roller side down it can be used as a hand truck to convey packages from point to point.

Adjustable-Height Platform Conveyor

For use in yards or other places where the gravity conveyor is too low to deliver the goods at the truck platform. This is portable and can be quickly moved from point to point. It is shown carrying bricks.



Gravity Roller Conveyor in Sections

This shows a Mathews gravity roller conveyor in 8 ft. sections, each a separate unit on castors. A line of any length can in a few minutes be arranged to deliver to any desired point. The illustration shows cases of beer being delivered directly to the loading platform.

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Rapid Loader a Time and Labor-Saving Device

This illustration shows the Rapid Loader in action. It is made by the Bonney Supply Company, Inc., 371 St. Paul St., Rochester, N. Y.; comes in sizes No. 2, capacity 30 cu. ft. water measure, $53 f. o. b. Rochester; No. 3, 36 cu. ft. water measure, $58 f. o. b. Rochester. Made of steel, in two parts. When loaded, but slight effort is needed to discharge the load, and the bucket returns to the loading position of its own accord when empty.

Lowerators

The Lowerator Co., Kent Avenue, Brooklyn, N. Y., put out a device for transferring quickly goods from any floor to a lower floor or to the loading platform. This is in the nature of a vertical traveling series of cars or shelves upon which the packages are placed, the weight of the packages themselves causing the motion. These cars or shelves are equally spaced and attached to endless cables which engage sheave wheels at the upper and lower terminals. A sheet-iron partition separates the cars lowering the merchandise, from the empty ones running up on the opposite side. The shelves are of finger type and discharge their freight by passing through a comb-like chute of similar construction. No power machinery is required, and hand labor is eliminated. As the packages reach their destination they are automatically taken off by the comb-like end of a slide which brings them down within reach of the men loading the vehicles. An automatic governor brake cares for the speed, which can be set at anything from 60 to 120 ft. per minute. By means of this device a heavy packing case does not travel any faster than a small 15 or 20 lb. package. The entire mechanism can be controlled by a brake lever on the shipping floor. The packages are placed on the device when it is in motion and it is not necessary to stop it for loading. This device is of course operated entirely by gravity and is being installed in many places where trucks handle the merchandise.

Canvas Belt Conveyors

One of the best known devices for assisting in conveying goods to the shipping department or to the truck platform is the canvas belt so largely used in department stores. These conveyors are power driven and consist of special woven canvas belts of from 3 to 4 ft. in width, traveling over rollers. They are almost universally used in the department stores of the large cities, spiral chutes and other devices being used in connection with them and delivering on to them. *(To be continued)*

Close View of Rapid Loader

These loaders are of metal, perfectly balanced on a central shaft, and are so mounted that after hand dumping, which can easily be done by a shoveler, they automatically by gravity resume their normal position. They are made in two parts, which are separable, so that they can be easily put in place, taken down or moved to another car. They are built in capacities of 1, 1¼ and 1½ yards, and are made by the Bonney Supply Company, 371 St. Paul Street, Rochester, N. Y.

Sectional View of Plant Showing Operation of Lowerator

This device, which may be termed a gravity elevator, runs at uniform speed under governor control, due to the weight of the material placed upon it, and delivers same at the loading platform

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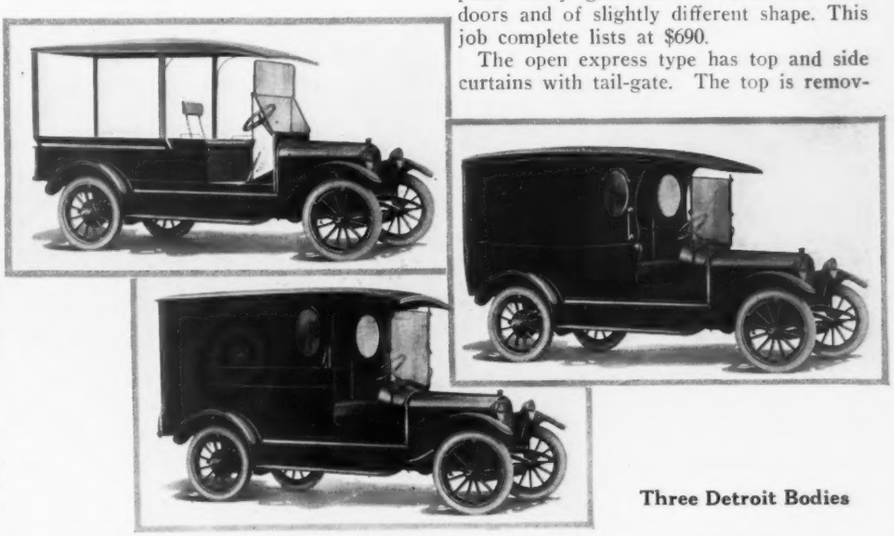
New 750lb. Detroit Package Wagon Prices, $690 and $745

WITH the idea in mind of placing in the hands of the consumer a car that would not only stand up under the severe requirements of the most strenuous delivery service, but one which would be marked by beauty, strength and sturdiness has prompted the Detroit Commercial Car Co., of Detroit, to design and build the Detroit Package Wagon.

Viewing the chassis as a whole, it will be noticed that it is made up of two units, one being the power plant from a point connecting to the drive shaft up to the radiator, and the other from the drive shaft connecting to and including the entire rear system and springs. Each of these units is supported at three points. The engine is supported rigidly by two supporting arms which are cast integral with the bell housing and bolted to the frame, and also by one flexible support at front cross member of the frame. There is no possible position in which the car can be placed on the road that will throw a strain upon any of the driving mechanism or the engine.

In addition to the flexibility and range of action obtained through this principle of construction, the efficiency of the chassis has been increased by the employment of what is known as the Hotchkiss type of drive. This means the elimination of any rigid driving connection, such as radius rods or rigid torque tube. The springs are so constructed as to enable their use for this purpose, besides eliminating many unnecessary parts and decreasing the weight of the car.

Every moving part of the chassis is enclosed in a dustproof housing. There is not a single moving part exposed to the dust and grit of the road. Even the two universal joints on the drive shaft are bound with a light sheet steel housing—packed with lubricating grease, which can be renewed when necessary.



Three Detroit Bodies

Upper view shows the $690 open express body, 60 in. long, 42 in. wide, and 56 in. high. Right view shows $745 De Luxe full panel body, swell sides, bevel plate glass in sides and doors; body 60 in. long, 43 in. wide and 56 in. high. Lower view shows $690 standard panel body. All models are fully equipped and have electric starting and lighting systems.

Detroit Package Wagon Chassis

Wheelbase 106 in; cantilever springs; quick demountable rims; 30 x 3½ in. tires, plain tread front, non-skid rear, standard equipment

Bodies

There are three types of bodies offered with the Detroit Package Wagon and in these are used the best of materials, well ironed and braced, insuring long life.

The standard panel is similar in construction to the De Luxe type, but with plain heavy glass in the sides and rear doors and of slightly different shape. This job complete lists at $690.

The open express type has top and side curtains with tail-gate. The top is removable, providing an open flareboard body, or wire screen sides can be placed on hinges for mail or express service. The price of this job is $690.

The De Luxe full panel job lists at $745 and has selected white wood panels with heavy hickory or ash ribs and slots, oak floor with oak or ash sills. Bevel plate glass in sides and rear doors.

Drive

The drive of the engine is transmitted to the rear axle through a chrome-nickel steel drive-shaft and two universal joints, which insures the highest efficiency. When the Detroit Package Wagon is loaded to its full capacity, there is practically a straight line drive to the rear axle, thereby eliminating any loss of power. Even when the car is not loaded to its full capacity the angularity is reduced to a minimum by employing two universal joints.

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Axles

The rear axle is of the full floating type. The wheel itself revolves through the medium of roller bearings about a stationary hub which is integral with the rear axle housing, thereby taking the entire weight of the car directly on the wheels, eliminating any but a turning strain or torque on driving axle which projects through the center, the shaft having a series of prongs or a clutch on the outside end which engages with a similar clutch on the hub of the wheel. Both live axles can be easily removed without detaching wheels or disturbing any other part of the rear system. This is accomplished by simply removing the hub caps and pulling out the axles. There are ten bearings in this rear axle.

The "I"-beam front axle is a one-piece drop forging with spring seats forged integral.

The front wheel spindles have liberal bearing surfaces, and steering knuckles are supplied with hardened steel bushings and pins. The tie rod is in the rear and above the axle, which fully protects it from all road obstruction. The reach rod is also above the lowest point of the axle, which affords it ample protection. The front wheels are mounted on two ball bearings.

The Engine

The engine is of the conventional four-cylinder high speed type. In order to eliminate all unnecessary weight the crankcase and the transmission case are made of aluminum. Even aluminum manifolds are used, wherever possible.

Cylinders are cast en bloc with valves located on the left side, enclosed with dustproof and oilproof plates which can be easily removed. The push rods are of the silent type and adjustable.

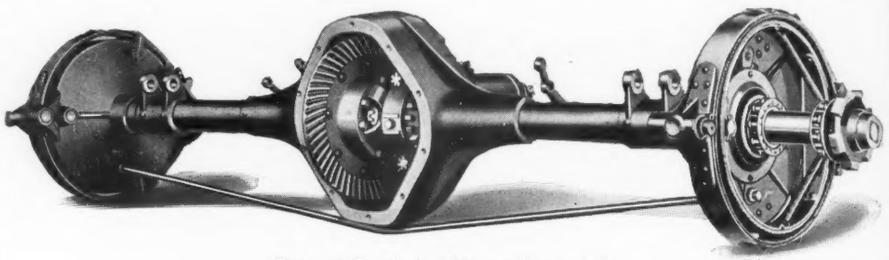
Lubrication is by means of the splash system supplemented by a plunger pump. The oil is pumped from the reservoir on the bottom side of the crankcase, being first forced through a strainer to remove all dirt and then to the front main bearing, from which it is distributed equally under all conditions to each connecting-rod division, and from there to the other moving parts of the engine by splash. Each piston is provided with oil grooves, which expose themselves on the downward stroke to the spray of oil inside the crankcase, and are of proper size to carry sufficient oil around the cylinders to lubricate piston, rings and cylinder wall.

Transmission

The transmission is of the selective type, with three speeds forward and reverse—mounted in a unit with the engine.

Transmission shaft and gears are chrome-nickel steel of liberal proportions. The main transmission shaft is mounted on ball bearings.

The top of transmission case is easily removed, which provides for necessary adjustments and inspection. The control lever and emergency brake are located to the right of the driver, and are mounted on top of transmission cover. The transmission operates in a medium weight oil which is supplied by means of a filler cap mounted on left of the housing.



Detroit Package Wagon Rear Axle

Heavy-duty, full-floating type fitted with ball and roller bearings

Spiral Bevel Driving Gears

These are chrome-nickel steel, specially heat-treated. Ball-bearing mounting on pinion shaft.

Clutch

The clutch, which is of the multiple disc type, permits a gradual engaging of the power so as to eliminate sudden jerk and jar.

This clutch operates in oil, and is easily adjusted through hand hole cover.

Ample cooling is maintained at all times by means of the thermo-syphon system.

The radiator is of the honeycomb type and of ample proportions. Air is drawn through it by a carefully balanced fan running on ball bearings. Extra large water jackets are provided in the cylinder casting which permits a free and continuous flow of water.

Wheels

Wheels are of the artillery type, natural wood finish, made of fine selected hickory. The spokes are of ample size to insure the greatest strength. Tires are 30x3½, plain tread front, non-skid in rear. One extra clincher endless demountable rim is furnished as standard equipment. Wheelbase is 106 in.

Frame

The frame is of channel construction of heavy gage metal and pressed from special carbon steel. It is narrowed in front to permit of a short turning radius. All cross members and braces are hot riveted, with pneumatic hammers which prevents the loosening of the rivets or parts. A liberal factor of safety is provided and the breaking point of frame member is considerably in excess of the load that it is designed to carry.

Springs

The front springs are of semi-elliptic type, of ample length and width. The rear springs are of the cantilever type.

Steering Gear

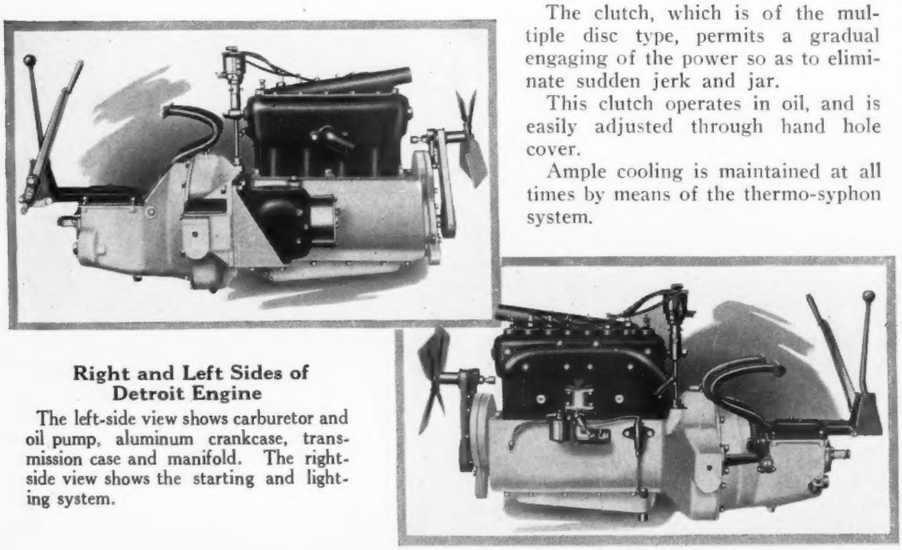
The steering gear is of the irreversible worm and full gear type, made very heavy. This type of construction prevents the road shock from being transmitted to the steering wheel and provides a very easy control of the car. The steering connections are of the ball and socket type with provision for adjustment. The steering wheel is 16 in. in diameter. Steering spider is of pressed steel enameled and baked

The standard Zenith double jet carburetor is used. The carburetor is aided by the utilization of heated air taken from a jacket on exhaust manifold through a flexible tubing to carburetor air intake.

Ignition

The ignition current for engine is supplied from the main storage battery through a Connecticut Automatic Igniter System, and which is mounted in an upright position at rear of cylinder, and driven from the rear end of camshaft.

Both throttle and ignition are controlled by means of hand levers mounted on the top of steering column.



Right and Left Sides of Detroit Engine

The left-side view shows carburetor and oil pump, aluminum crankcase, transmission case and manifold. The right-side view shows the starting and lighting system.

Wichita Worm-Drive Commercial Car Models

THE Wichita Falls Motor Co., Wichita Falls, Tex., announces four commercial car models to be sold during the coming season. These models are known as K, L, M, and O, having carrying capacities of, respectively, one, one and a half, two, and three and a half tons.

Model K, One Ton

This Wichita model has a four-cylinder block engine of which the bore is 3½ in. and the stroke 5 in. Spark plugs are S.A.E. size; valves enclosed, protecting them from dirt and dust. Ignition is provided by a high tension magneto.

Lubrication is effected by a horizontal plunger oil pump in connection with a splash system. Oil scoops on the lower ends of the connecting rods throw oil up into the bearings and over the cams, gears, and other moving parts. The capacity of the oil reservoir is 1¾ gallons.

Cooling is by thermo-syphon system, using a 5½-gallon cellular type radiator. The inlet hose connection is 1¾ in. in diameter, and there is a four-bladed aluminum fan mounted on ball bearings to assist in the cooling.

Clutch

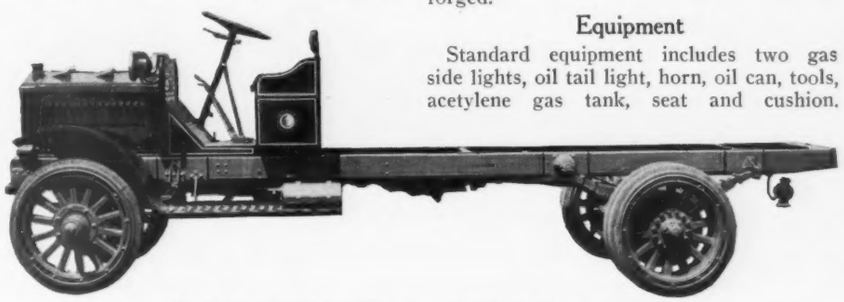
The clutch is a quick adjustable leather-faced cone clutch with spring inserts. Size is 14¾x1¾ in.

Transmission is selective sliding gear type, of three speeds forward and one reverse, direct drive on third speed. Gears have 1-in. face.

Drive is by propeller shaft to the transmission, thence by tubular shaft to the worm-drive axle.

Axles

Front is "I"-beam, drop forged, 2½x 1½ in. with spindles 1 11/16 in. Rear axle is Sheldon worm drive, ratio 7.8 to 1.



Wichita Model O, Three and a Half Ton Chassis

The length of this chassis is 20 ft. The engine in this model is 4¼ x 5¾ in. The axles, springs and frame on this chassis are heavily constructed

Springs are semi-elliptic, heat-treated. Front, 40x2½ in., nine leaves, suspended under frame, rear being 50x3 in., nine leaves, side bracket suspension.

Emergency and service brakes are internal expanding on rear wheel drum, each 16¼x2 in.

Wheels are artillery type, front and rear having fourteen spokes each, spokes front, 1¾ in., rear 2 in.

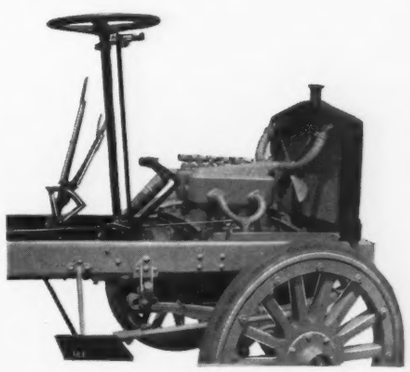
Tires are solid, 36x3 in. in front, 36x4 in. rear.

Frame is pressed steel channel, 4x2x¼ in. on 118-in. wheelbase, and 5x2x5/16 in. on 144-in. wheelbase. The 118-in. wheelbase is standard, the 144 in. being optional at extra cost. Steering is worm and nut type from the right side of chassis. Tread is 56 in. Frame is 30 in. wide.

The normal speed is 15 m.p.h. Control levers are centrally located and are drop-forged.

Equipment

Standard equipment includes two gas side lights, oil tail light, horn, oil can, tools, acetylene gas tank, seat and cushion.



Side View of Front of Model M Chassis

This illustration shows engine, aluminum fan, front spring construction and control levers and pedals.

Finish is standard yellow on chassis and wheels. Price, $1650, f. o. b. Wichita Falls, Tex.

Model L, One and a Half Ton

This model has few differences from the Model K. The main differences will be noted herewith, the other details being the same. This model is geared slightly lower at the rear axle, being 8.66 to 1. The rear tires are 36x5 in., slightly heavier than Model K. Frame length is optional in this model also. Rear springs have eleven leaves. Equipment and finish the same. Chassis price, $1800, f. o. b. Wichita Falls, Tex.

Model M, Two Ton

This model varies from Model "K" slightly more than does the Model "L." The differences from Model K follow:

Rear springs are 56x3 in., with thirteen leaves. Steering spindles are 1 31/32 in. Rear axle reduction is 10.67 to 1. Front tires are 36x3½ in., rear are 36x6 in., or 36x3 in. dual. Normal speed is 13 m.p.h.

Frame is 5x2x¼ in. on 118-in. wheelbase, and 5x2x5/16 on 144-in. wheelbase.

Rear View of Wichita Model O, Three and a Half Ton Truck

The feature of this illustration is the all-round heavy construction. Channel-section frame is 7 in. high; springs 3 in. wide, and have fifteen leaves; tires 36 x 5 in. dual; brake drum 20 x 5 in.

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Finish and equipment the same. Chassis price, $2100 f. o. b. Wichita Falls, Tex.

Model O, Three and a Half Ton Truck

This model has larger engine, and is more strongly built throughout. The differences from Model K are herewith noted: The engine has four cylinders, cast in pairs, bore, 4¼ in.; stroke, 5¾ in. Valves enclosed. Engine is suspended on a subframe.

Lubrication is by gear oil pump and splash, oil base capacity, 2 gallons. Connecting-rods have oil scoops.

Cooling system consists of centrifugal pump, 7½-gal. cellular type radiator, and four-blade aluminum fan with ball bearing.

Rear View of Wichita One-Ton, Model K Truck

This illustration shows the wide brake drums for the two sets of expanding brake shoes; also the wheel, spring, and rear axle detail

Clutch

Clutch is 15¾x2⅝ in., this being the only difference from the Model K clutch. Transmission gears have 1⅜ in. face.

Springs are semi-elliptic, front have ten leaves and are 46x2½ in., rear 56x3 in., fifteen leaves. Front axle is larger, being 3⅜x2¼ in., with 2⅜-in. steering spindles. Rear axle gear reduction is 11¾ to 1.

Brake drums on this model are 20x5 in., and spokes are heavier, front 2¼ in., rear, 3 in. Front tires are 36x5 in., rear 36x5 in. dual. The wheelbase is 165 in., tread, 66 in. Normal speed is 11 m.p.h.

Frame

This is channel section pressed steel, 7x2¼x¼ in. Frame is 36 in. wide. Finish and equipment is the same as Model K. Chassis price, $3250 f. o. b. Wichita Falls, Tex.

New International Motor Truck Has Low Wheels and New Heavy-Duty Engine

THE new model M International Motor Truck, made by the International Harvester Co. of America, Inc., of the Harvester Bldg., Chicago, Ill., is equipped with a two-cylinder "L"-head engine of the opposed type, and low wheels, they being 36-in. In addition to these features are the following important points, the sealed governor, roller bearing transmission, roller bearing countershaft, and the counter-balanced crankshaft. Model M truck has a capacity of 1000 lbs., price, $710.

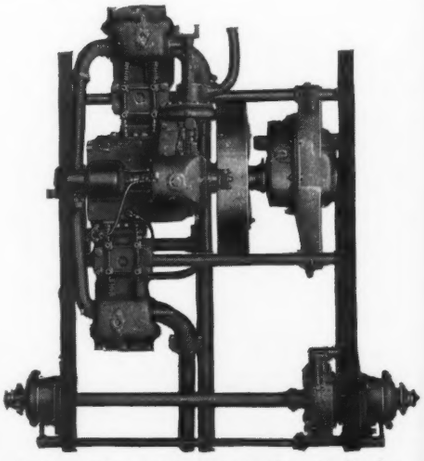
This engine is of the "L"-head, water-cooled, two-cylinder opposed type. It is four-cycle and simply constructed, and built for heavy duty. It is equipped with a sealed governor to prevent speeding. The bore is 4½ in., stroke 5 in., and engine is rated at 20 h.p.

The crankshaft and connecting rods are high grade steel, heat-treated. The crankshaft is counterbalanced, which results, it is claimed, in reducing vibration and making a smoother running engine. All bearings are high grade and of ample size. Pistons are ground to size and have four rings each.

Cooling

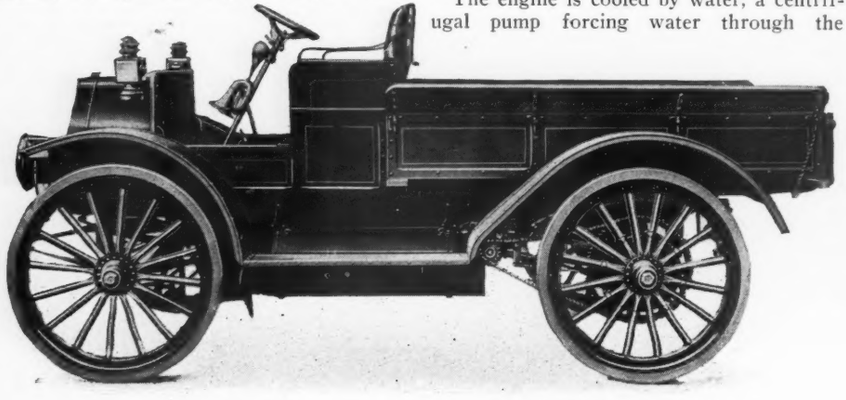
The engine is cooled by water, a centrifugal pump forcing water through the vertical tube radiator. A fan also assists cooling. Lubrication is by force feed gear pump.

Chain drive is used, a single chain from engine to countershaft and two chains from countershaft to the rear wheels.



International Model M Two-Cylinder Opposed Engine and Self-Aligning Countershaft

This illustration shows the countershaft, with sprockets for final chain drive to wheels; the brake band for service brake on the differentials; the heavy-duty engine with side-by-side valves; detachable cylinder top, and flywheel.



New Model M International Truck, With Small Wheels, and Two-Cylinder Opposed Heavy-Duty Engine

This new Model M has 20 h.p. engine, 4½ x 5 in; 36 in. wheels; two sets of brakes; chain drive; speed governor; counterbalanced crankshaft; transmission and countershaft equipped with ball bearings.

Transmission

The transmission gives two speeds forward, one reverse, with direct drive on high, all speeds being operated from one

lever. Transmission is selective type of special design, with gears always in mesh. A locking device prevents gear shifting with the clutch engaged. Roller bearings are used in transmission.

The improved countershaft is stronger and long-wearing. It has roller bearings in self-aligning, grease-tight cages. The brake drum is large, providing efficient braking area. The brake drum is pressed steel and is detachable. Service brake contracts on differential, emergency is internal expanding on rear wheels. Right control of steering.

Springs

Full elliptic springs are used, front being 36x1½ in., rear 36x1¾ in., with auxiliary cross spring in rear.

Wheels are 36 in., front 2 in. and 2½ in. rear side wire tires. Wheels have roller bearings. Gasoline capacity is 10 gallons.

Body

Inside dimensions are 76x42 in., with 11 in. panel and 6 in. removable flare boards.

Equipment includes seat, fenders, magneto, two gas headlights, generator, three oil lights, horn and tools.

New One Thousand Pound, Pneumatic-Tired Kearns Truck Claimed Very Economical

THE new pneumatic tired delivery truck of 1000 lb. capacity announced by the Kearns Motor Truck Co., Inc., of Beavertown, Pa., is claimed to be economical in that it is said it can be run at a cost of $.02¾ per mile. This chassis has 107 in. wheelbase, standard tread, unit power plant, including Lycoming engine and Grant-Lees transmission, Disco starter, electric lights, and weighs complete 1900 lbs. Price, $785.

Unit Power Plant

Consists of Lycoming engine Model "L," cone or multiple disc clutch, and Grant-Lees transmission of selective sliding gear type, three speeds forward, one reverse.

The engine has bore of 3¼ in., stroke, 5 in., four cylinders, "L"-head type cast in block. S.A.E. rating 16.9 h.p., develops 28 h.p. at 1600 r.p.m. Cylinders and pistons are of close grained grey iron, latter having three rings. Connecting rods are drop forged "I"-beam 40 carbon steel, double heat treated. Crankshaft is two bearing 40-50 carbon steel double heat treated. Helical timing gears for quietness, valves are 1⅜ in. Cooling is by Thermo-Syphon, lubrication splash, constant level system by plunger-pump driven from eccentric on camshaft.

Starting System

The starter is a Disco, run by the 12-volt battery, driven by silent chain from front of engine.

Drive is by Spicer universal joint and encased shaft to rear axle, floating type. Front axle is one piece drop forging, "I"-beam section, 2¼ in.

Springs, front, are semi-elliptic, rear three-quarter elliptic. Torque is taken up by two 1-in. steel tubes with ball and socket joint at end of transmission case.

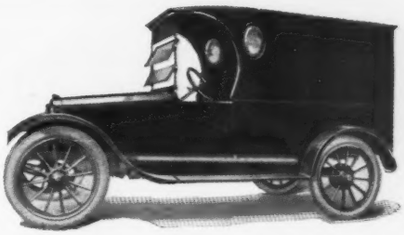
All bearings in driving shaft are annular ball and Hyatt roller.

Brakes

Brakes are double, foot service brake being internal, 10x2 in. Emergency is external, 10x2 in. Lavine worm and sector steering gear, with 18 in. wheel right or left side.

Gasoline tank of 10 gallons capacity is located under cowl. Wheels have demountable rims, tires 30x3½ in., twelve spokes 1¼ in.

Control levers are in center. Both hand and foot control of throttle.



New One Thousand Pound Kearns Truck

This new Kearns model has unit power plant, Disco starter, electric lights; and with body as shown or open body sells for $785.

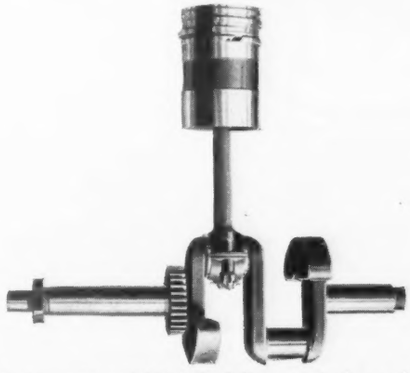
Bodies

Either closed panel or open sides with curtains may be had.

Color is optional, standard is green and black. Frame is pressed steel.

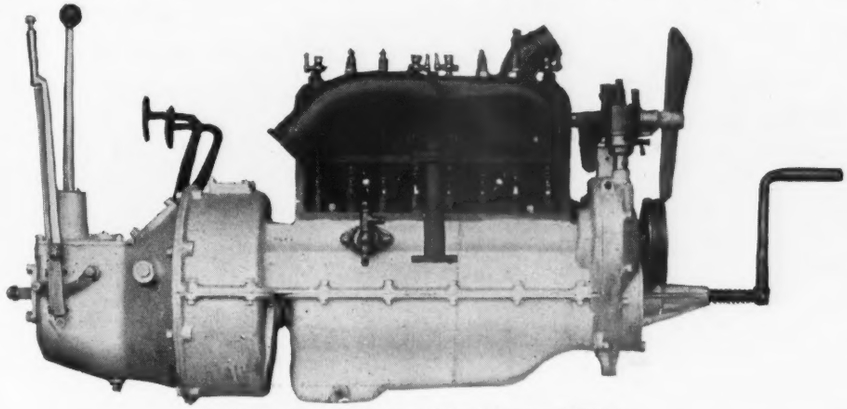
Body space is 44x60 in., also space under seat. Fenders are pressed steel.

Equipment includes starting system, battery, three electric lights, windshield, extra rim, fore doors, electric horn, etc.



International Model M Counterbalanced Crankshaft

By these counterbalancing weights, the maker claims the engine runs much smoother and has less vibration. The lower end connecting-rod bearing is high-grade Babbitt, the upper is phosphor-bronze on hardened steel pin.



Unit Power Plant of New Kearns Truck

The engine is a Lycoming Model L, 3¼ x 5 in.; Grant-Lees transmission is selective sliding gear type. This engine is said to develop 28 h.p. at 1600 r.p.m.

AWARDS MADE FOR TRUCKS FOR POSTAL SERVICE

Following out the plans of the Postmaster General for the trying out of several types of automobile trucks in actual service in the larger post offices of the country, an award for such trucks for use in Detroit, Philadelphia, St. Louis and Chicago has been signed. The awards made were as follows:

One-half ton capacity—Ford.

Three-quarter ton capacity—GMC, Buick, White.

One and one-half ton capacity—GMC, Packard, White.

Three ton capacity—Kelly-Springfield, White, Packard.

The new service in Chicago, Philadelphia and St. Louis will go into effect November 15, and will supplant in part screen wagon, electric car, mail messenger and city delivery service.

An automobile stage has been established between Chico and Polk Springs, Cal., which will make three round trips to the Springs each week by the way of Sutton House.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Three New Dart Models Added to the 1916 Line

THE Dart Motor Truck Co., of Waterloo, Ia., have added to their 1916 line Model "D," for light delivery, capacity, 750 lbs., equipped with open express body, price, $675; Model "BB," capacity, 1500 lbs., price of chassis, $1300; and Model "CC," capacity, 2½ tons, price of chassis, $2100.

Model D, Light Delivery

This chassis has standard tread, 108-in. wheelbase, and is equipped with open express body. This model has electric starting and lighting system, finish is battleship gray, Brewster green, maroon or any combinations of these. Jack, tools and tire repair outfit are included.

Engine

A four-cylinder engine is used, with cylinders cast in block, high speed type with bore, 3¼ in., stroke, 4 in., said to develop 25 h.p. Crankshaft and camshaft are made of chrome-nickel steel, heat-treated. Cooling is accomplished by thermo-syphon system, honeycomb radiator, and 14-in. ball bearing fan. Lubrication is by splash and plunger pump.

Tires

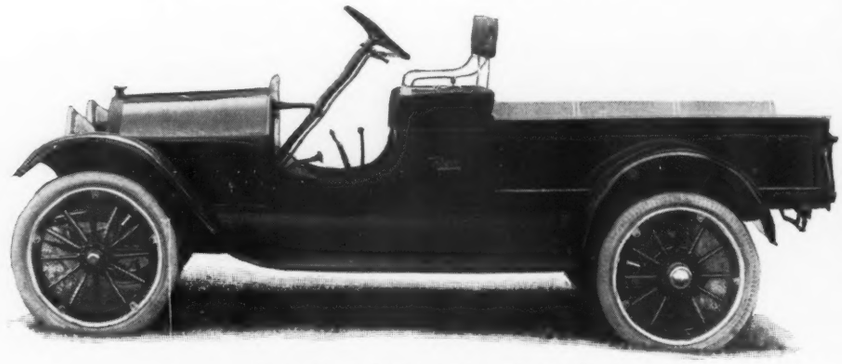
All wheels are equipped with 30x3½-in. tires. Fenders, front and rear, are crown type. Electric lamps front and rear.

Model BB

This model has a capacity of 1500 lbs. the price including chassis with driver's seat, no body being included. It has unit power plant, standard tread, 124-in. wheelbase, front axle clearance, 11½ in.; rear, 11 in.; chassis over all is 178 in.; from back of seat to end of frame is 94¼ in. Equipment includes hand horn, oil side lights, oil tail light, tools and jack. Option of solid tires, 36x3 in. front, rear 36x3½ in., or pneumatic tires and demountable rims, front, 36x4 in., rear, 36x4½ in., pump included. Option of Gibney or Firestone tires.

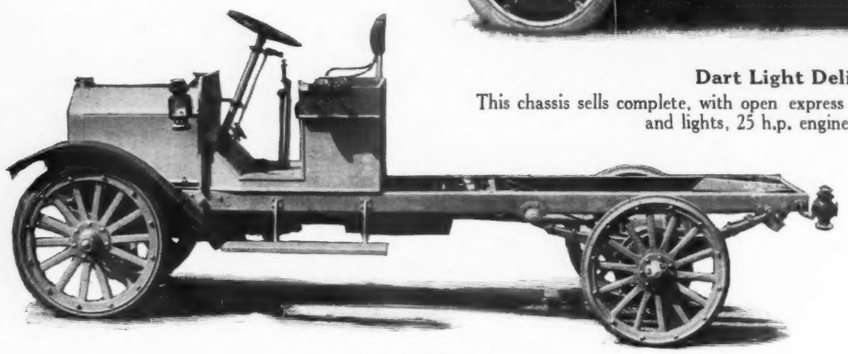
Engine

The Buda four-cylinder engine is used, bore, 3½ in.; stroke, 5⅛ in.; cylinders, "L"-head type cast in block. It is water cooled by thermo-syphon system, honeycomb radiator, which is mounted to frame with ball and socket trunions and fan. Lubrication is by splash system and force feed, capacity, 1½ gallons.



Dart Light Delivery Car, Model D

This chassis sells complete, with open express body, as shown, for $675 It has electric starter and lights, 25 h.p. engine, 30 x 3½ in. pneumatic tires



Dart Model BB Chassis

This chassis has fifteen hundred pounds capacity; the four-cylinder Buda engine, and Fuller transmission and clutch combining to make a unit power plant. Rear axle is worm drive

Transmission

The sliding gear transmission has three speeds forward and one reverse, ball bearings, and gears of chrome-nickel steel. Center control.

The clutch is of the multiple disc type, running in oil. The starting and lighting system is single unit, driven by silent chain, running in bath of oil.

The carburetor is a Zenith, double jet type, with dash adjustment, gasoline tank located under the seat.

Rear Axle

This is of the full floating type, with spiral bevel driving gears of chrome-nickel steel, with roller and ball bearings. The two sets of brakes are internal expanding and external contracting on drums 12x2 in. Bands are lined with wire woven asbestos.

Front springs are semi-elliptic, rear are cantilever. Wheels are artillery type with quick demountable rims and one extra rim furnished as part of equipment.

The carburetor is a Stromberg "G2," 1¼ in. Ignition is by Eisemann high tension magneto.

Transmission

This is the Fuller selective type, three speeds forward, one reverse. Gears have ⅞-in. face, shafts are mounted on annular ball bearings, both being of chrome-nickel steel. The Fuller clutch is of multiple disc type, dry plate.

Drive is by shaft from the unit power plant to the worm drive rear axle, driving

Dart Model BB Unit Power Plant

This illustration shows the unit power plant, control levers and pedals. This Buda engine is L-head with valve mechanism enclosed

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

thrust and torque being taken through springs. Springs are semi-elliptic, double heat treated, front being 37x2 in., rear, 50x2¼ in. Rear springs are fastened to rear axle housing by alloy steel clips of large diameter.

Axles

The rear axle is of the semi-floating type, with worm wheels and differential mounted on roller bearings. Front axle is "I"-beam section, drop forged, 1⅝x2½ in., with nickel steel steering knuckle spindles, 1½ in. diameter.

Brakes are duplex type, internal expanding on rear wheel drums 14x2 in. Steering gear is the Ross type "BR" screw and nut, irreversible, left side steering, with 18-in. wheel.

Frame

Frame is pressed steel, channel section, 4 1/16x3¼x3/16 in. Wheels, front and rear are artillery type, 36 in., mounted on roller bearings. The gasoline tank is made of Terne plate of 15 gal. capacity, including a 3-gal. reserve.

Model CC

The chassis and driver's seat are included in the price of this 2½-ton model, which has a wheelbase of 150 in., standard tread, chassis over all being 210 in. long and 71 in. wide. From driver's seat to rear of chassis is 120 in. Clearance, 10¼ in. Equipment includes mechanical horn, three oil lamps and too kit.

Unit Power Plant

The engine is a four-cylinder Buda, bore, 4⅛ in., stroke, 5½ in., "L"-head type cylinders cast in block. Transmission is selective type, three speeds forward, one reverse, and the clutch is a Fuller, of multiple disc dry plate construction. The engine is cooled by water, centrifugal pump, honeycomb radiator, and fan, keeping the water cool and in circulation. The carburetor is a Stromberg "G2," 1¼ in. Ignition is by Eisemann high tension magneto with set spark. Lubrication of the engine is by splash and pump system.

Springs

Front springs are semi-elliptic 39x2½ in., of Silico Manganese alloy steel. Rear are semi-elliptic, 56x3 in., of "Resista" Silico Manganese alloy steel. All spring eyes are bronze bushed.

Service and emergency brakes are 16x3 in. each, applied direct to rear wheels. Wheels are of cast steel, 36x4 in. front, rear being same size dual, each being mounted on roller bearings. Tires are solid rubber, front 36x4 in. and rear 36x4 in. dual, with option of Gibney or Firestone.

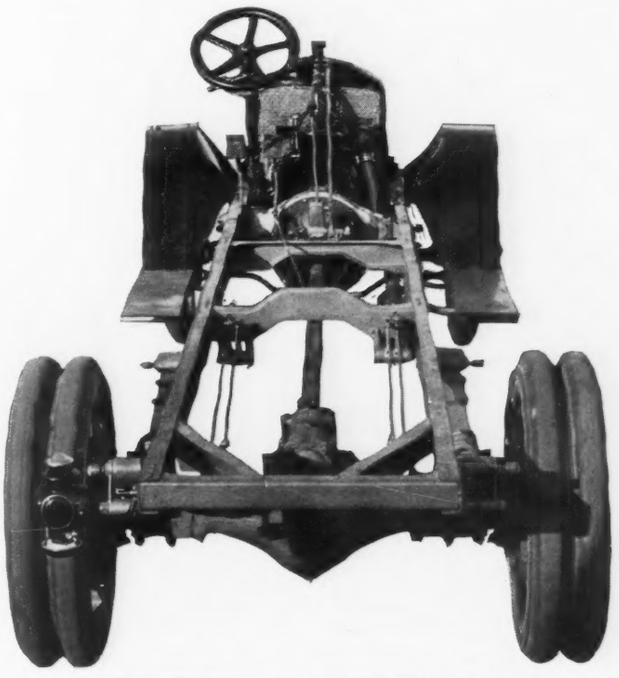
Axles and Differential

Front axle is a one-piece drop forged "I"-beam section of 35-45 per cent. carbon steel, size 1¾x2¾ in. Rear axle is semi-floating construction, worm wheels and differential being mounted on high grade bearings. All thrust is taken by extra large double thrust bearings.

Differential gears and pinions are 3½ per cent. nickel steel, heat treated, 1½ in. face. Axle shafts are of 3½ per cent. nickel steel, heat treated. Steering gear is the Ross type "BL." screw and nut, irreversible, with 18-in. wheel.

Frame

The frame is of pressed steel channel section, 5x2x¼ in. The seat back is provided with cushion and upholstered seat back. Tool box and gasoline tank are inside the same. Tank is made of Terne plate metal, is of 15 gal. capacity, including 3-gal. reserve.



Rear End View Dart Model CC Chassis

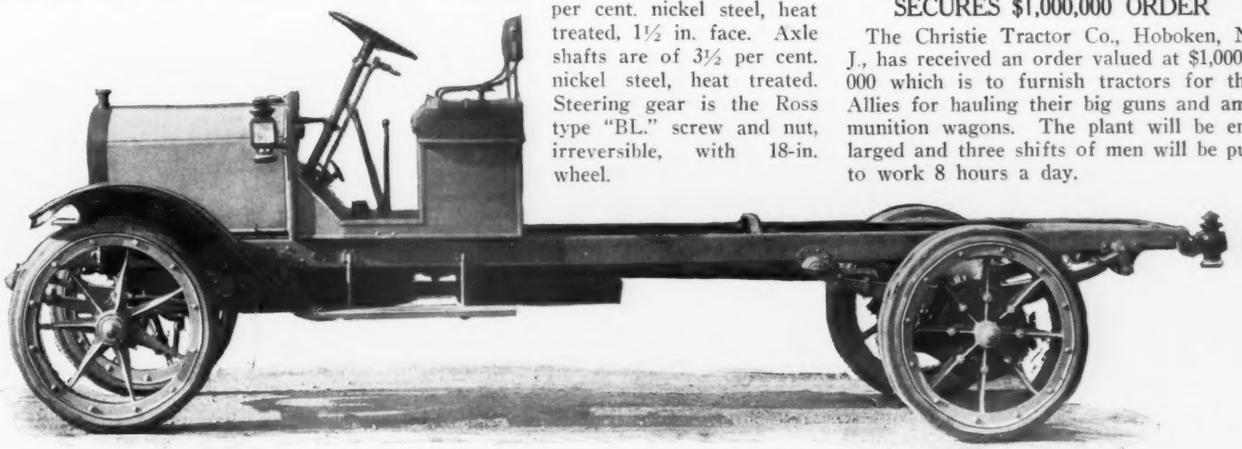
As can be apprehended from the illustrations, this chassis is the most heavily built of the three models. Frame, springs and tires all show sturdiness. Wheelbase on this model is 150 in.

SIGNAL TRUCK PRICES RAISED

The Signal Motor Truck Co., Detroit, on September 15th raised the prices of three of its models, which will be as follows: One-ton model, $1550 instead of $1500; 1½-ton model, $1750 instead of $1700; 2-ton model, $2100 instead of $2000.

CHRISTIE TRACTOR COMPANY SECURES $1,000,000 ORDER

The Christie Tractor Co., Hoboken, N. J., has received an order valued at $1,000,000 which is to furnish tractors for the Allies for hauling their big guns and ammunition wagons. The plant will be enlarged and three shifts of men will be put to work 8 hours a day.



Side View of Dart 2—2½ Ton Chassis

This chassis is 210 in. over all. The frame channels are 5 x 2 x ¼ in. Note the cast-steel wheels. This chassis has engine 4⅛ x 5½, Buda make; unit power plant; worm drive; Stromberg carburetor, and Eisemann high-tension magneto

The CCJ leads in circulation, advertising and prestige

Three New Stegeman Truck Chasses Have Worm Drive and Four and Six-Cylinder Engines

THE recent announcement of the Stegeman Motor Car Co., of Milwaukee, Wis., discloses three sizes of chasses, each having Continental engine, unit power plant Timken axles with David-Brown worm-gear drive, and an entirely new principle of transmitting driving stresses to the chassis whereby the load is pulled, not pushed.

The 1½-ton worm drive Stegeman chassis has Continental long stroke, heavy duty truck type engine of 35 h.p. The chassis price is $1900 f.o.b. Milwaukee. The 2½-ton chassis has the same engine, with heavier built frame, springs, axles, tires, etc., the chassis price being $2500 f.o.b. Milwaukee. The third and largest of the worm drive chassis is the 3½-ton model, which has Continental engine with six cylinders, rated at 50 h.p.

One and a Half Ton Chassis

This model has 150-in. wheelbase, 56½-in. tread, weight of chassis 4200 lbs. Bodies built to customers' specification.

Regular equipment includes three oil lamps, tools, hub odometer, horn, jack and seat with back and cushions.

Unit Power Plant

This is the long stroke truck type engine, bore 4⅛ in., stroke 5¼ in., three point suspension. The sealed governor limits its speed to 1100 r.p.m., which limits the car speed to 18 m.p.h. Lubrication is by the splash system, and in addition a double plunger pump forces oil to all bearings. Cooling is by water circulated by gear driven centrifugal pump assisted by four-blade fan.

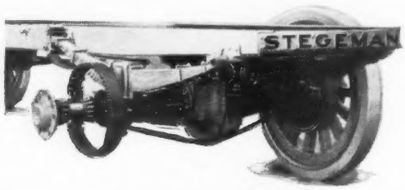
Ignition is by Eisemann high tension waterproof magneto, with automatic spark advance. The latest type Stromberg carburetor is used with hot air connections.

Transmission has Timken bearings, is of the selective type giving three speeds forward and one reverse, with nickel-steel gears. A dry plate multiple disc clutch is used, having twenty-five steel plates, asbestos lined on either side.

Axles, Brakes

Front axle is drop forged, "I"-beam section Timken, size 2x2¾ in. The rear is Timken make, full floating type, with David-Brown worm gear drive. Reduction 7¾ to 1.

The two sets of brakes are internal expanding, lined with asbestos wire fabric,



Stegeman One and a Half Ton Truck Rear Axle With One Wheel Removed

This illustration shows the sturdy appearing rear construction. Timken wheel bearings are shown; also the asbestos wire fabric lining the internal expanding brake.

the foot service brake, of 13 in. diameter, acting on propeller shaft and the emergency brake acting on the rear wheel drums.

Springs

Semi-elliptic springs are used front and rear, made of the best mangano-silicon steel. Front are 48x2¼ in., rear 54x2¼ in. Wheels are of artillery type, second growth hickory, with front tires solid, size 34x3½ in.. and solid rear tires 36x5 in.

The frame is pressed steel channel section, of 5x2x3/16 in. stock. The Ross steering gear of worm and nut type has 18-in. steering wheel. Control is left side, levers in the center, and foot accelerator, with no levers on the steering column. Gasoline tank of 25 gal. capacity is under driver's seat.

New Drive Feature

This new principle of pulling the load instead of pushing it is brought about by mounting the forward end of the rear spring on a free swinging shackle which is said to reduce danger of breakage to give a more flexible spring action, especially toward the center of the chassis, while the rear is attached to an extension attached rigidly to the frame.

The Two and a Half Ton Chassis

The wheelbase of standard chassis is 144 in., but a long chassis of 162 in. may also be had, tread being 58 in., or a special tread of 56½ in. front and rear may be had. The weight of chassis is 5000 lbs. Body and equipment are the same as the 1½-ton model.

Unit Power Plant

In the balance of this description the details of difference only of this chassis and the 1½-ton chassis will be noted.

The unit power plant is the same throughout, but the car speed is reduced to 15 m.p.h. because of the greater reduction at the worm drive.

The front axle is the same except for size, being 2¼x3 in., and the rear is the same design but has gear reduction of 9¾ to 1.

Springs

The springs on this chassis are semi-elliptic all around, but are larger, being 42x2½ in. in front, and 60x2½ in. at the rear. Wheels are the same, tires being larger in front, being 34x4 in. solid, the rear having dual tires each 36x4 in. The frame is heavier, size 5x2½x¼ in.

The new principle of pulling instead of pushing the load is used on this model also.

The Three and a Half Ton Chassis

This model has the longest standard wheelbase, it being 156 in., with wide tread of 65 in. Chassis weight is 6000 lbs. Body and equipment the same.

Unit Power Plant

The engine in this model is six cylinder with bore of 3¾ in. and stroke of 5¼ in., the balance of the unit power plant being the same as the other chasses have.

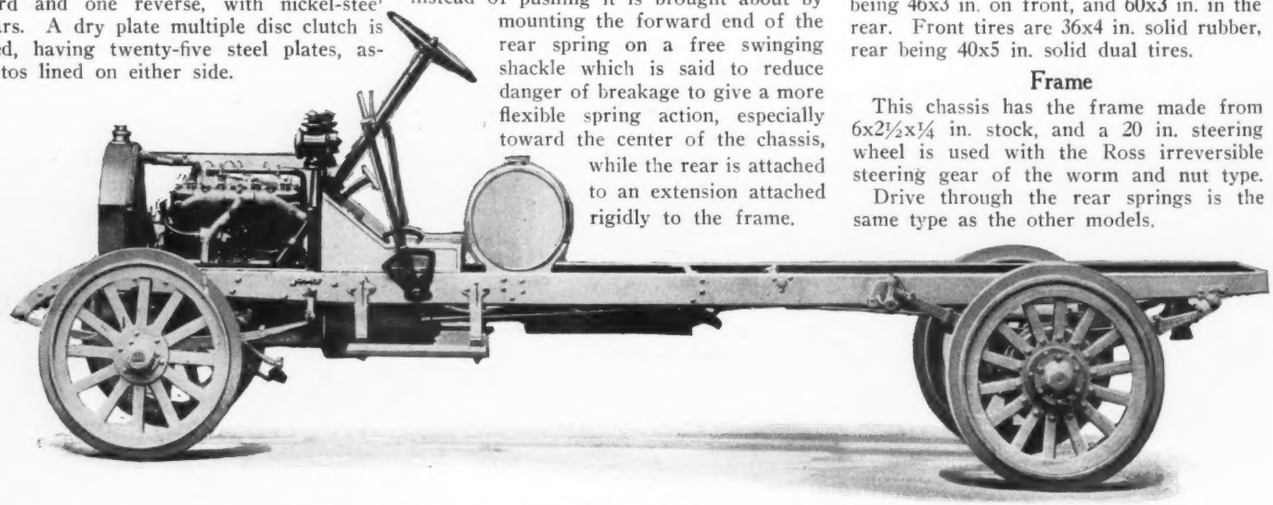
The front axle is 2½x4¼ in. section. The rear axle gives a reduction in gearing of 10.3 to 1, limiting car speed to 12 m.p.h.

Springs are the same type, but larger, being 46x3 in. on front, and 60x3 in. in the rear. Front tires are 36x4 in. solid rubber, rear being 40x5 in. solid dual tires.

Frame

This chassis has the frame made from 6x2½x¼ in. stock, and a 20 in. steering wheel is used with the Ross irreversible steering gear of the worm and nut type.

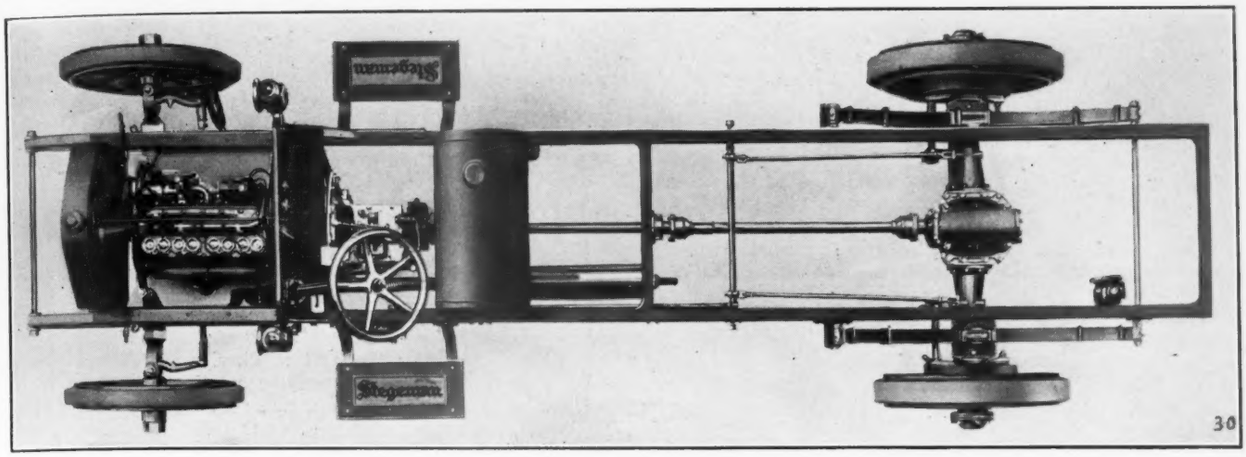
Drive through the rear springs is the same type as the other models.



New Principle of Transmitting Driving Stresses on the Stegeman Worm-Drive Truck

As will be noticed, the rear spring has its front end shackled, the rear half of the spring pulling the load, which is claimed to eliminate the danger of breakage. This is the one and a half ton chassis

The CCJ has most advertisers because it gives them biggest returns



Top Plan View of Stegeman One and a Half Ton Worm-Drive Chassis
This chassis is equipped with Continental engine of 35 h.p., has unit power plant with selective transmission, the David Brown worm drive equipped with Timken bearings

HORSES AND STREET CARS OUSTED FROM MAIL SERVICE IN CHICAGO. COMMERCIAL CARS TAKE THEIR PLACES

PLANS have been formulated by the United States Postal Department to take over the service in Chicago now operated with electric street cars, and all horse-drawn vehicles by superseding them with commercial cars. This progressive action means the abandonment of the contract service for the receipt and dispatch of all Chicago U. S. Mail, the rental service of horse-drawn vehicles for the parcel post and a complete United States Postal owned commercial car transfer system.

The Chicago main post office, now, to its fifty-one branches in the postal district, receives and dispatches mail over six lines of street railway postal car routes. The service now requires haulage from the main post office and transfer to the railway postal cars, and then, on very many routes, again, to another vehicle to deliver the mail to the branch post offices. A commercial car service is to supersede this triple transfer system, making for speed and economy of operation, and the new service will be the first part of the new transfer scheme to go into operation—loading commercial cars on main post office platform with direct delivery to destination.

Every horse is going—the next move being their abandonment for down-town service, even extending beyond the "loop" boundaries, between the main post office and the annex station on Monroe Street between Des Plaines and Halsted Streets, the Canal station in the great Chicago and Northwestern Railway depot and to four other railway terminals. For this service 75 to 80 commercial cars of 3, 1½, ¾, and ½ tons capacity will be required, although but few of the smaller capacity will be placed in the service. At present 284 wagons are engaged in this service, which will be the last to be motorized.

For the receipt and dispatch of the mail, every day, over 1200 wagons operate from the main post office, doing their great part as an aid to "loop" traffic congestion. Connection is made with 514 trains daily —150 tons of outgoing and incoming mail is the daily transfer.

The Chicago post office is in the market for a garage with a capacity for 150 commercial cars and a complete machine shop, or repair plant, a combination hard to find all ready for the service.

As an object lesson to the teaming interests of Chicago this movement means very much, as the service is arduous, inasmuch, as from present prospects the postal department is making the change solely for economical reasons and present plans appear as if far more is expected from the motor equipment than the horse ever gave in service, and yet, putting eight against twenty-four hours, the commercial car is more than likely to win out—if so, its prestige will advance with the teaming interests, as the postal motor service should demonstrate efficiency as well as economy and obtain a tremendous relief from traffic congestion in the busiest part of the "loop."

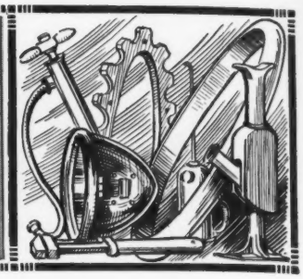
SPECIAL GASOLINE TANK BODY FOR FORD CARS

The Ohio Welding & Mfg. Co., of Cincinnati, Ohio, has designed a special body for oil companies that must provide a method of transportation of gasoline and oil quickly to the garage or owner that requires a supply in an emergency. The outfit consists of a 100-gal. tank with extra cans of lubricating oil when required, making just the right load for Ford cars. The tank complete can be attached the first time in an hour or two, and after that it requires not more than five minutes to attach or detach. This means that the car can be used for other purposes. The outfit is furnished with faucets, air vent, etc., and with or without box for measures, funnels, etc.

Quick Delivery Attachment for Gasoline or Oil
This body attachment is for Ford cars, and is made by the Ohio Welding & Manufacturing Company, of 828 West Sixth Street, Cincinnati, Ohio. Made of 14 gage steel, all joints welded. Equipped with Duplex air vent, faucets, etc., and comes with or without box for funnels and measures. The first attachment of tank takes an hour or two, but thereafter changing to either turtle-back body or tank body will take but few minutes.

The CCJ has most readers because it gives most information

TRUCK ACCESSORIES AND APPLIANCES

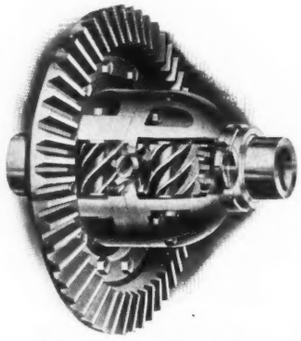


THE M & S DIFFERENTIAL

Although this device was previously announced in these columns, we were at that time unable to show detailed illustrations of it, and we trust therefore that the accompanying illustrations and article will give our readers an adequate idea of the construction and merits of this new form of differential construction. The M. & S. Differential which is the product of the M. & S. Gear Co., 1036-42 Whitney Bldg., Detroit, Mich., is manufactured in the shops of the Brown-Lipe-Chapin Co. of Syracuse, N. Y., which company has purchased the exclusive American manufacturing right on this novel type of differential. This device can be applied to any make of car, and in addition to furnishing it for use by the manufacturer, it is being made for replacement in Ford cars, known as the M. & S. Special Type for Ford cars.

In this device there are two or more pinions mounted in the differential housing which is rotated by the engine, and also two crown wheels, one attached to either driving wheel. But, in addition, there are worm gears interposed between the pinions and the crown wheels, the teeth on which are shaped to correspond. These worms are mounted in the differential casing with their axes at right angles to those of the pinions. It will be seen, then, that the rotation of the differential housing in the usual way by the tailshaft causes both pinions and worm wheels to be carried around bodily in rigid relation to each other, whilst at the same time both pinions and worms have a power of rotation upon their own axes, so that they can move rotationally, but not bodily, in relation to each other.

When road resistance is sufficient to give adhesion to each driving wheel, both wheels are equally driven, the crown wheels to which they are attached being carried bodily round by the worms in which they are in engagement, just as, with an ordinary differential, they are carried round by the pinions. But when road resistance upon one wheel is reduced to a point at which it loses adhesion, and would, with the ordinary differential, start spinning, nothing of this kind happens, because the



The M & S Differential Assembled

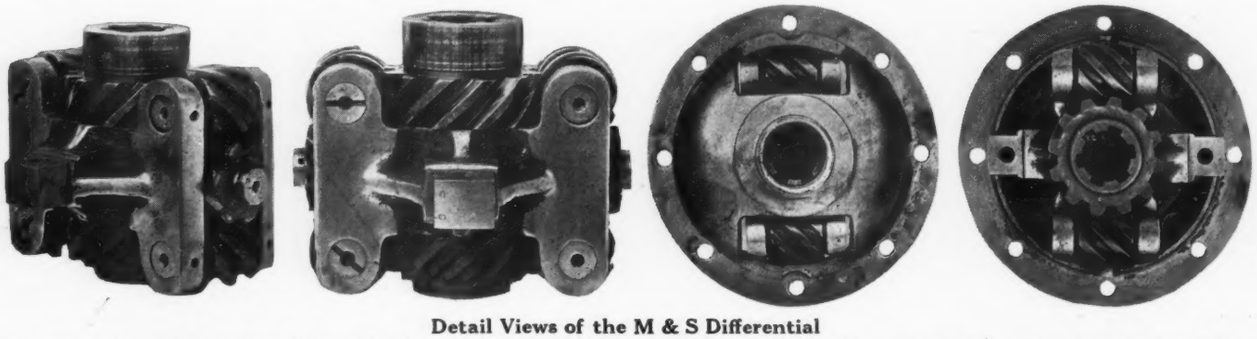
angle of the worms is such that, whilst the crown wheels can drive the worms, the worms cannot drive the crown wheels, and, as a consequence, the differential is locked so far as any movement of the wheel in relation to the differential is concerned. The axle becomes for all practical purposes a solid one, and all the drive is taken up by the wheel, which is for the moment supported on firm ground and can take advantage of its grip.

When both wheels are on firm ground and the car traveling freely, the differential is enabled to act in the usual manner when turning corners, by reason of the fact, already alluded to, that the crown wheels can drive the worms. Each driving wheel is attached to its respective crown wheel, and when a curve in the road is followed, the outer wheel is forced by its contact with the road to travel a greater distance than the inner one. The outer wheel, therefore, revolving faster than the axle, turns the worm in connection with it and so enables the central pinions to act and react on the worms with a differential action and to distribute the power to each wheel in the usual manner. It will be seen that the action is the same in either direction; so that the gear behaves equally well whether the car is going forward, reversing, or is driving the engine.

It is claimed that this new device not only meets the wheel-spinning difficulty entirely, but at the same time prevents skidding, or sideslip on greasy roads. It may be mentioned that it is already in use on a number of trucks, including the Jeffery Quad. It may be interesting to note that, after some eight months' use of it, Mr. L. H. Bill, of the Jeffery Co., says that it has never failed to work satisfactorily, that with it antiskid devices are unnecessary, and that it will take the car over roads that it would be impossible to pass along with an ordinary differential.

Reinforced Ribs in Magnalite Pistons

The above illustration shows the manner in which the Magnalite piston made by the Walker M. Levett Company, 10th Ave., cor 36th St., New York City, is ribbed, so as to distribute the carrying strength and take care of every possible stress at extremely high speed. At the same time a featherweight construction is permitted, which assures a mininum weight for the piston, with a consequent lessening of weight at the vital point of the reciprocating parts. These pistons weigh about one-third as much as iron pistons.



Detail Views of the M & S Differential

The first and second illustrations, left to right, show end and side views of the internal gear set assembly. The third illustration shows the face of the differential housing, which carries the drive gear. The fourth illustration shows the M & S internal gear set in the differential housing

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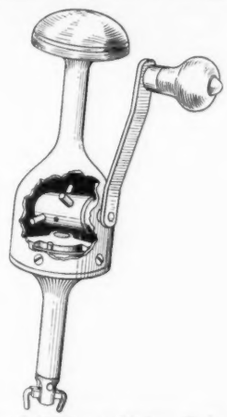
THE GOODELL-PRATT VALVE GRINDER

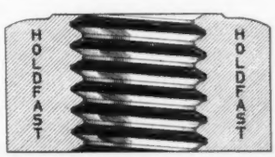
The Goodell-Pratt Co., Greenfield, Mass., has recently made an addition to its line of automobile tools in the form of a valve grinder. Either a blade or an adjustable spanner—both part of the equipment—may be held in the jaws of the grinder, an oscillating motion being transmitted to the spindle or shaft by means of the simple internal mechanism, which is contained within the cast-iron housing in Style No. 288, and in an aluminum frame in the style designated as No. 467. This mechanism is unique in its simplicity, consisting of a rotating shaft fitted with hardened steel pins which strike a cutout sector or disc, first on one side of the center and then on the other, thus causing the grinder spindle to rotate first in one direction and then the other. The finish of the No. 288 is japan, the head of lignum-vitae, and the entire tool is neat and compact, as well as practical. A good idea of its appearance and design may be gained from the accompanying cut.



Goodell-Pratt Valve Grinder

SOFT FRICTION METAL ON THREADS HOLDS NUT TIGHT

The feature of this new self-locking nut is that it does not require the use of an extra nut, spring, washer, or cotter pin to keep it in place, but instead is prevented from loosening by a soft friction metal imbedded in its threads.



Section of Holdfast Nut

The Holdfast Nut as it is called, is made by chemically welding on the threads of a standard nut a soft friction metal, part of which is then removed by tapping with a specially designed tap. The friction metal being under compression becomes imbedded in the rough surfaces of the bolt threads, and it is claimed no amount of vibration can loosen the nut. As the soft metal is removed from the bearing or load surface of the threads and left on the clearance side only, it cannot be squeezed or forced out no matter how great the stress. The nut can be started on the bolt with the fingers and then easily wrenched into proper contact. The maker claims that this bolt cannot rust on, may be used a number of times, and does not have to be wrenched to an exact tension in order to hold.

The Holdfast Nut is made by the Holdfast Nut Co., 344 S. Hoyne Ave., Chicago, in any style and grade of nut with any standard thread, also a line of S.A.E. sizes.

SERVICE TOOL BOX

This tool box is made by the Service Motor Supply Co., of Washington Boulevard and Desplaines Street, Chicago, Ill. Since the box is 22 in. long it will accommodate almost any pump, and batteries, jacks and tools may also be carried in it. It is made of the best open-hearth full cold-rolled, full pickled reannealed limed stock obtainable. Finished in black enamel, hand rubbed and baked. Equipped with Yale lock, and two suit case snaps.

Service Tool Box

This tool box will fit many cars conveniently; the size is 22 x 9 x 7 in. and the price is $2, equipped with lock.

THE SOUTHWARK TIRE FORCING PRESS

The illustration herewith shows the new type of tire forcing press which has been developed by the Southwark Foundry & Machine Co., Philadelphia. The press is made entirely of steel castings instead of built-up beams and cylinders, thus giving great strength with no increase in weight.

A feature of this press is that the lower table is movable and is very low, so that it is not necessary to lift the tires; which, of course, makes the handling much easier.

A decided advantage in this press is that the ram is brought down to the work through the idle stroke, with tank water; so that no power whatever is required except for doing actual work.

The whole machine is controlled from a patented operative valve which is so designed that at any time the press is at rest—either on the up or down stroke—the water is automatically by-passed.

The makers state that one of the larger tire companies is now installing twenty-four of these machines.

The Southwark Two Hundred Ton Hydraulic Tire Forcing Press

PACKARD ARMORED CABLE FOR STARTING AND LIGHTING SYSTEMS ONLY

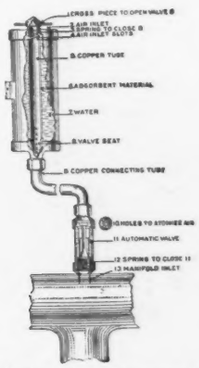
In our September issue, on page 34, we mentioned that the Packard Electric Co., of Warren, Ohio, was bringing out an armored cable for ignition purposes. This is incorrect. The armored cable is not intended for ignition work, but has been designed expressly for lighting and starting purposes, and is not intended to take the place of this company's standard ignition cables.

TRIPLEX GAS ECONOMIZER

The Triplex Gas Economizer Co., 223 West 49th Street, New York City, has put on the market a fully automatic device, for removing carbon from engine cylinders, valves and plugs, and decreasing gasoline consumption.

It consists of a brass tank carrying water (7) which is attached to the dashboard under the hood and an automatic valve (11) set in the manifold above the carburetor where the gasoline vapor passes into the combustion chambers, and flexible copper tubing connects the two.

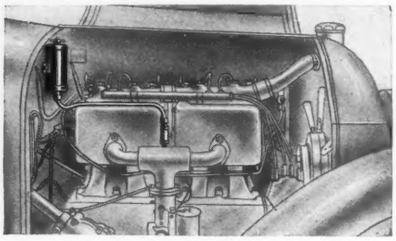
Its operation is ingenious, positive and effective. The tank construction is a copper tube (5) covered with absorbent material (6) to assist moistening the air drawn in. The tube passes down through the center with a water tight valve seat (8) in its lower end. It is held closed by a spring (3) at the top. There are two milled slots (4) at the upper end of this tube,



Triplex Gas Economizer

This sectional view illustrates the economizer clearly. Copper tubing of any length is supplied.

and four rounded holes in the top cover of the tank through which air is sucked over the water into a mixture at the manifold (13). This insures a constant supply of air of high humidity or moisture. The construction of the automatic valve is such that it atomizes and mixes it with the gasoline vapor in quantity proportioned to the speed and pull of the engine.



Triplex Gas Economizer
This illustration shows the device attached, all parts being under hood

To thoroughly clean the combustion chambers of carbon deposits the engine is run at high speed until warmed up. By lifting the copper tube in the water tank by a cross pin in its upper end, and giving it a quarter turn, the valve at the bottom is opened and the water allowed to run to the warm combustion chambers where it is instantly converted into steam. The steam cuts and loosens the carbon which is discharged through the engine exhaust. At the end of this operation, which is not necessary except the carbon exists, the valve in the water tank is closed and the tank refilled.

The manufacturers seem to be justified in claiming, after a year's test and operation of their device, that the constant mixture of moist air with gasoline vapor thoroughly prevents the formation of carbon. Moreover that the proportionately increased introduction, automatically accomplished, of atomized air with the gas mixture, cuts down the gas consumption from 10 to 40 per cent. This, of course, increases the mileage per gallon of gasoline and is thus a saving in gasoline bills. Price complete is $7.50.

BIG TRUCK FOR AUTO EXPRESS SERVICE

With better roads in this country the demand for motor trucks will be many times greater than the supply, is the prophecy of R. E. Fulton, vice-president of the International Motor Co. Motor truck lines are already competing with the railroads for short haul business, and are reducing the delivery time four-fifths.

In territories not at present accommodated by railroad transportation there are great possibilities for developing freight highway transportation routes.

The Harford Transportation Co. of Baltimore has entered this field and will operate a daily auto express and freight line between Havre de Grace and Baltimore, Md., picking up freight at local points along the route. A 5-ton Saurer truck with low loading platform and large capacity body has been purchased for this service. The truck has an inclosed cab, which will provide for the comfort of the driver in all kinds of weather, and is equipped with a large electric searchlight for operation at night.

The Palos Truck Express Company, 77 Post office Place, Salt Lake City, Utah, has been organized for the purpose of operating an express line between Salt Lake City and Garfield. The cars leave Salt Lake at 7.30 and 10 a.m. daily. In addition to this, special machines are sent out every afternoon to take care of any special business which may come up during the day requiring quick delivery.

HARFORD TRANSPORTATION CO.
Harford Transportation
HILLEN & FRONT STS.
DAILY AUTO EXPRESS AND FREIGHT LINE BETWEEN HAVRE DE GRACE AND BALTIMORE, MD.

A Five-Ton Saurer in Express Service
Operates daily between Baltimore and Havre de Grace Md.
Made by International Motor Company

Trucks Facilitate Construction of United States Fortifications at San Pedro, Cal.

This fleet of Locomobile trucks, engaged in hauling materials for the construction of the United States fortifications at San Pedro, Cal., has a life of which just half is spent in long uphill grinds. Up and down the same hill for seven thousand miles already on this, their first job, under direction of Major R. R. Raymond, U. S. Engineer Corps, the trucks and Goodrich tires are in fine shape, and have demonstrated satisfactorily both speed and economy in heavy military construction. Loading is from special bunkers, built under direction of Major Raymond, which have been shown in a previous issue.

The CCJ leads in circulation, advertising and prestige

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the nineteenth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

PART XIX

THE FRAME

THE chassis frame practically forms the foundation of a commercial car, since all the power-transmitting and other units are attached to it. It is often referred to as the backbone of a commercial car. Its construction depends to some extent upon the general scheme of the chassis layout, the construction of power transmitting units and their mounting, as well as the method of final drive, wheelbase, etc.

When the commercial car was first introduced, comparatively little attention was paid to the frame, as other things such as the power plant, axles, etc., were deemed of greater importance, hence the frame received slight consideration. However, after experiencing considerable difficulty due to accidents and other failures which were traced directly to poor frame construction, commercial car builders discovered that frames could be designed with greater strength and with less weight if the problem was given proper consideration.

Unit Power Plants and Flexible Mounting

The constant trend of obtaining perfect alignment for the engine, clutch and transmission has resulted in the adaption of the unit power plant on some models, while in others, particularly of the heavier type, flexible mounting of the units has been resorted to. In fact, regardless of unit construction, all individual units are generally flexibly mounted to some degree, in order to relieve them of the heavy stresses due to frame weaving when the road wheels mount an obstacle on the road surface. However, since this subject of power plant mountings is of considerable importance, this will be discussed in detail in the succeeding chapter, the author confining this installment to the construction of the frame. In discussing this subject, it may be necessary in some cases to refer to the general chassis construction in order to clearly depict each type.

The most prominent types of truck frames made be divided into three classes, according to their popularity:

First, the pressed steel frame.

Second, the structural channel frame.

Third, the structural I-Beam frame.

These may again be divided into various classes, depending upon the general construction and material as well as the distribution of the main units.

The Pressed-Steel Frame

The pressed steel frame is quite popular on all types of vehicles and is now universally used on vehicles up to and including those of 1-ton capacity. Above this capacity the structural channel and I-beam frames are still used by a number of makers, however, the pressed steel frame is rapidly gaining favor and from present indications will eventually replace the other types.

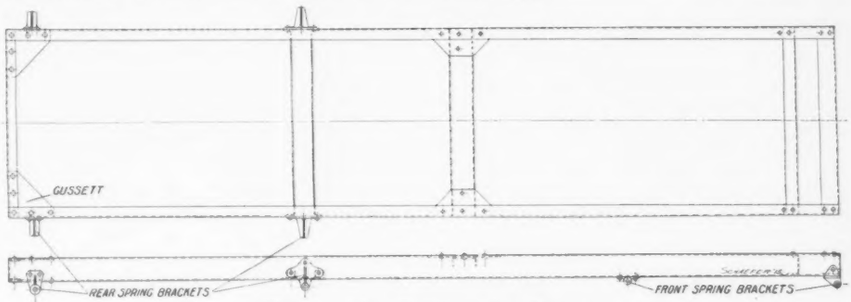


Fig. 1. Vim Delivery Car Frame

Pressed steel, with straight side rails and cast spring hangers, which are riveted to the former

In discussing the advantages and disadvantages of the various types, the pressed steel frame may be mentioned as being lightest in weight for equal strength of the structural or rolled channel and I-beam section, while its cost is somewhat higher due to the use of heat treated material to obtain maximum strength. The cost varies with the section, material, and the nature and extent of bending.

The straight side rail is of course the cheapest construction, however, when conditions permit, this is usually tapered at

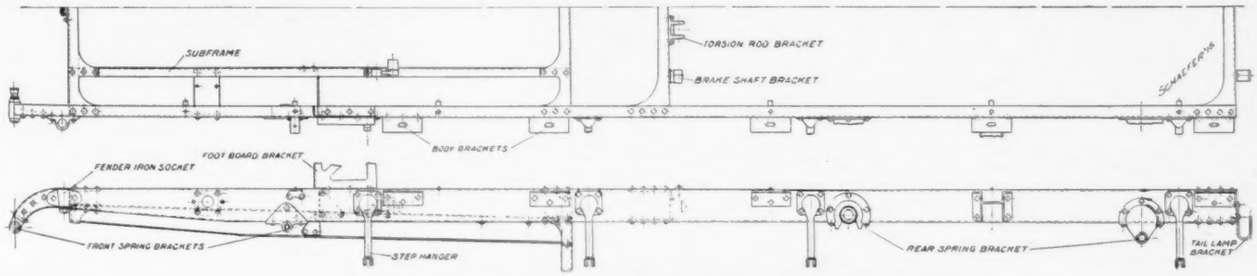


Fig. 2. Reo Fifteen Hundred Pound Pressed-Steel Frame

Employing straight side rails, which are tapered and bent at the front ends. This construction embodies a rigid subframe, which is set at an angle to provide as near as possible a straight-line drive

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the front and the rear and the forward end is sometimes formed to receive the spring hanger. When the seat is placed above the engine this taper is usually very short, permitting the paying load to be carried well to the front. Bumpers are sometimes provided to protect the chassis, these may either be formed integral with the frame or attached to it by castings.

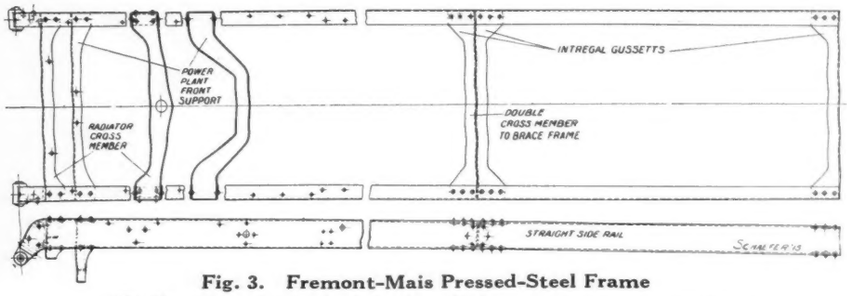

Fig. 3. Fremont-Mais Pressed-Steel Frame

The idea sought after in the design is to eliminate unnecessary cross members, so that the frame forms a flexible construction

When the side members are inswept to permit a short turning radius, it is necessary to make the flanges of the side rail of considerable width at this point, tapering gradually toward the rear, to provide the proper strength at the point of offset.

Cross Members

Cross members are usually made of the same material as the side rails and when pressed, have integral gussets, this of course is not possible with the rolled sections, so that separate gusset plates must be used, thus placing the strain on the rivets, instead of on the cross member.

These frames of either type, are used in both flexible and rigid constructions. While both kinds of material are subject to heat treatment, it is generally conceded that pressed steel is a higher-grade metal than rolled stock. Owing to its temper, it will stand a certain amount of bending which would give rolled stock a permanent set or crack it. It is alleged that pressed steel is more sensible to vibration, in that it will crystallize sooner than rolled steel under similar conditions. Instead of being built up rigid, as are rolled steel frames, the pressed steel frame may be built up flexible, so that instead of taking the vibration dead, as well as sudden shocks, it gives to them and transmits them to other parts, so that the individual vibrations in any part are reduced by distribution. The pressed steel flexible frame may also be made lighter for its strength because of its flexibility.

The Rigid Frame

The rigid frame too, has advantages, whether it is of pressed steel or rolled stock. It permits the body to be secured rigidly to it and as it does not give to the inequalities of the road, there is no racking of the body. An advantage of rolled stock is its cheapness, except of course in the lighter models of the assembled type for which frames can be purchased at low figures. Another advantage of rolled stock is the ease with which the wheelbase can be altered. The maker using this type of frame may with little additional expense give customers a shorter or larger frame than standard.

It is possible to alter the pressed steel frame in length by cutting off from the maximum length, although this disturbs the nice proportioning of the frame for stresses, one of the important advantages of this type.

Effect on Springs

The effect of frame construction upon the design and duty of the springs must also be considered. This feature is not generally understood, but has an important

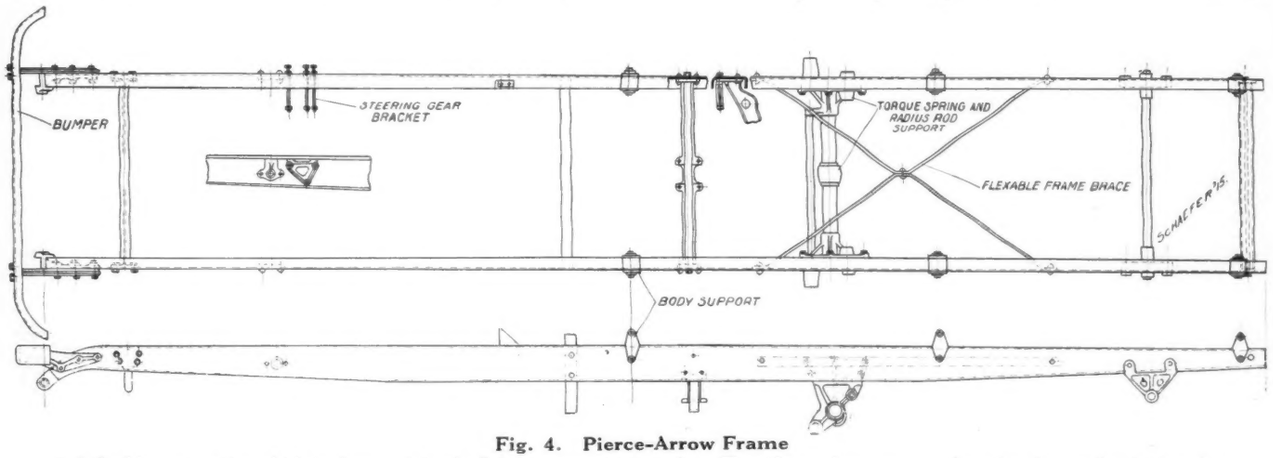

Fig. 4. Pierce-Arrow Frame

A flexible construction which is characteristic of all Pierce worm-drive trucks. The side members are pressed steel and tapered at both ends

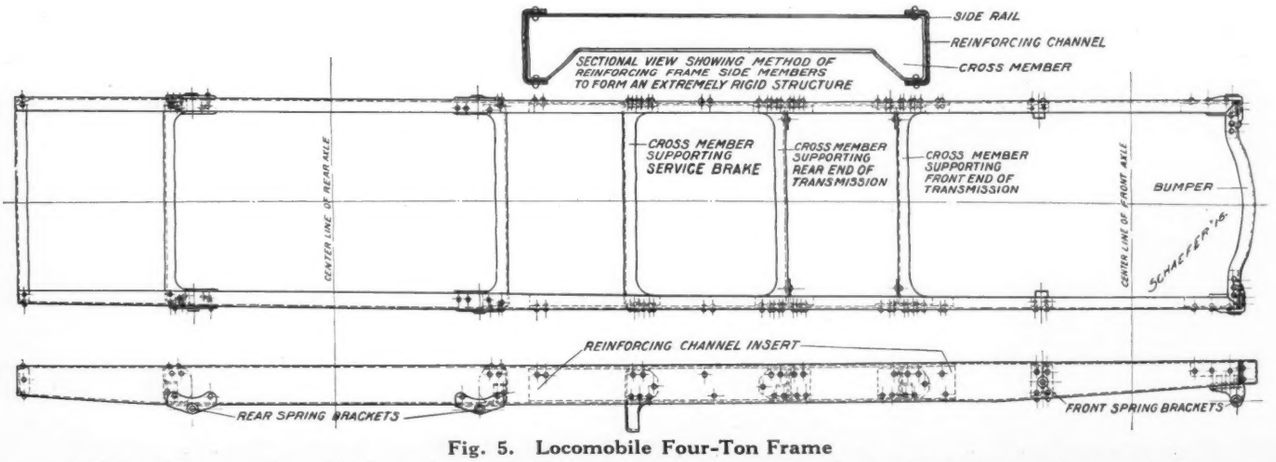
SIDE RAIL
REINFORCING CHANNEL
CROSS MEMBER
SECTIONAL VIEW SHOWING METHOD OF REINFORCING FRAME SIDE MEMBERS TO FORM AN EXTREMELY RIGID STRUCTURE
CROSS MEMBER SUPPORTING SERVICE BRAKE
CROSS MEMBER SUPPORTING REAR END OF TRANSMISSION
CROSS MEMBER SUPPORTING FRONT END OF TRANSMISSION
BUMPER
CENTER LINE OF REAR AXLE
CENTER LINE OF FRONT AXLE
SCHAEFER '16
REINFORCING CHANNEL INSERT
REAR SPRING BRACKETS
FRONT SPRING BRACKETS

Fig. 5. Locomobile Four-Ton Frame

This is a rigid construction and is of pressed steel with side members tapered at both ends and cast spring brackets riveted to the side rails

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bearing upon the life of the vehicle. A rigid frame relies upon the springs to allow for all axle displacement. If the front and rear wheels on opposite sides be raised several inches simultaneously, the frame is subjected to a torsional stress. If the frame is rigid, springs of considerable camber must be employed in order to absorb the shock without being bent past the limit of safety and sufficiently flexible to absorb all of the shock without any tendency to lift the other wheels from the ground. For this reason a different type of spring is used on a rigid chassis than on flexible ones. The use of underslung spring suspension has come into great favor for this reason, as it permits the frame to be carried fairly low, without sacrificing spring camber or necessitating a dropped rear axle.

The flexible frame when diagonally opposite wheels are raised does not impose all of the duty on the springs, but warps and

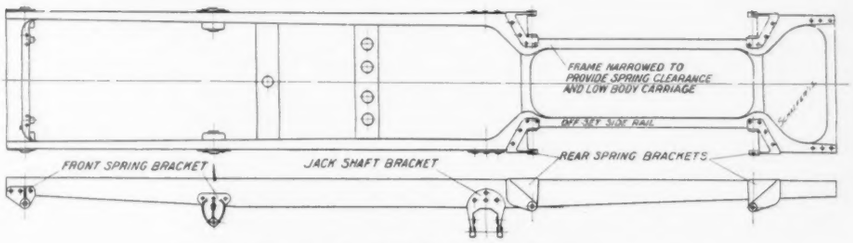
FRAME NARROWED TO PROVIDE SPRING CLEARANCE AND LOW BODY CARRIAGE
OFF SET SIDE RAIL
FRONT SPRING BRACKET
JACK SHAFT BRACKET
REAR SPRING BRACKETS

Fig. 6. DeKalb Four-Ton Frame

This is of conventional design with the exception of the side rails, which are inswept alongside the rear springs, much the same as the conventional side member is narrowed from the dash forward

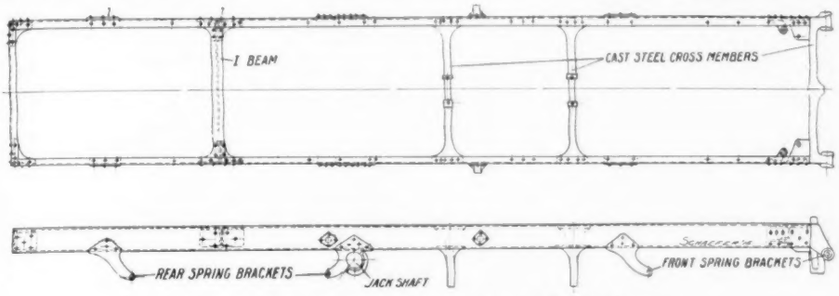

Fig. 7. U. S. Three-Ton Structural-Steel Frame

This is an illustration of a structural or rolled-steel frame combined with steel castings and a construction in which each unit is mounted as flexibly as possible

absorbs a part of the stress. For this reason springs on flexible chassis are usually flat or nearly so, with a reduced amount of play. Flexible construction also permits the frame to be carried equally as low as with the underslung spring, and yet the spring is perched above the axle, where it is more nearly in line with the center of gravity, thus reducing sidesway.

Details of construction such as spring hangers, etc., vary considerably, as can be noted from the descriptions of the various types, which follow:

Specific Illustrations

The Vim ½-ton frame, Fig. 1, illustrates a construction of pressed steel, with straight side rails and cast spring hangers which are riveted to the former. Owing to its shortness on account of the small size of the vehicle this frame is unusually strong.

The Reo ¾-ton frame, Fig. 2, also employs straight side rails; however, these are tapered and bent at the front end to receive the spring hanger. This illustration shows in detail all parts which are riveted to the frame and also a rigid sub-frame construction, which is set at an angle to provide as near as possible a straight line drive to the rear axle. All cross members are provided with integral gussets, while pressed steel parts such as step hanger, body brackets, etc., are used to keep the weight within reasonable limits for this size of vehicle. One-ton frames are built along similar lines.

Fig. 3 depicts the Fremont Mais 1½- to 2-ton frame, with straight side members, bent at the front end to receive the spring brackets. In this construction, the scheme is to eliminate unnecessary cross members, so that the frame forms a flexible construction; however, it presents an excellent method of providing strength at the point where the drive, which is taken by the springs, is transmitted to the frame. This is accomplished by placing two cross members together to form an I-beam structure.

Fig. 4 shows the flexible frame construction, which is characteristic of all Pierce worm-drive trucks. The side members are pressed steel and taper at both ends, the front being bent to form the spring hanger, while the bumper is also attached at this point. But two cross members are used, as such parts as the spring brackets and torsion rod support are used for this purpose, while the rear member is of tubular section. A brace of cross shape serves to form a flexible support at the point of drive. In this construction the drive is taken through radius rods attached to a bracket which also forms the spring bracket and carries the tubular member from which the torque arm is supported.

The Locomobile trucks are also worm-driven and are equipped with radius rods and torque arm to take the torque and driving thrust; however, the frame, Fig. 5, is made of rigid construction. It is made of pressed steel with side members tapered at both ends and cast spring brackets riveted to the side rails. The forward cross member forms a bumper, while the remaining members support the transmission and service brake and form braces at the points of spring anchorage to the side rails. The extreme rigidity of this construction can be noted by the numbers of cross members, the method of reinforcing the rail with an extra channel insert.

Fig. 6 depicts the De Kalb 4-ton frame, which is also of pressed steel with tapered side members. This frame is of conventional design with the exception of the side rails, which are inswept alongside the rear springs much the same as the conventional side member is narrowed from the dash

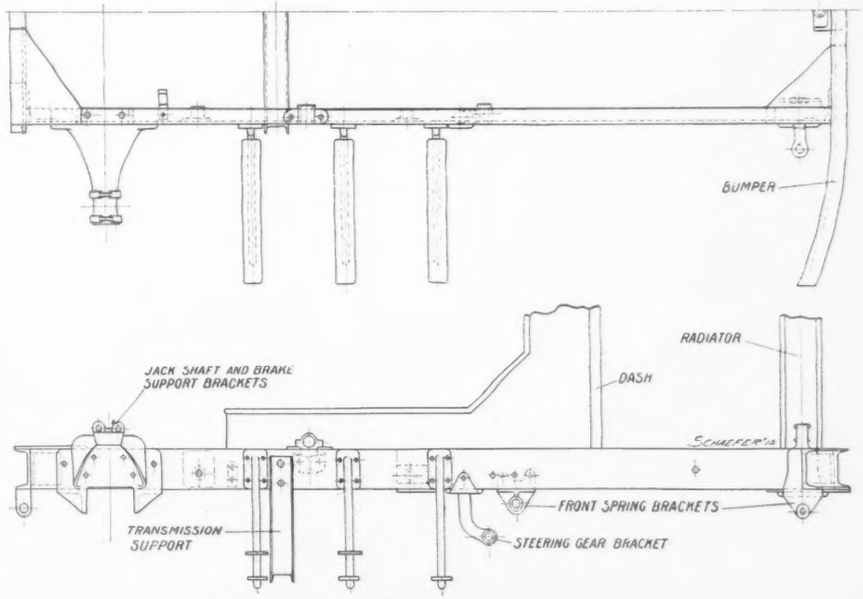

Fig. 8. Knox Tractor Frame

Made from rolled steel of channel shape. This is comparatively short, as the rear axle is attached to the frame by means of cantilever rear springs

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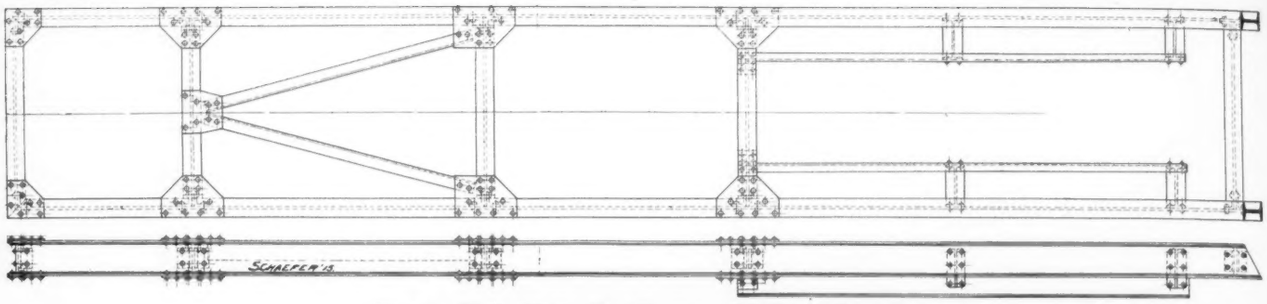


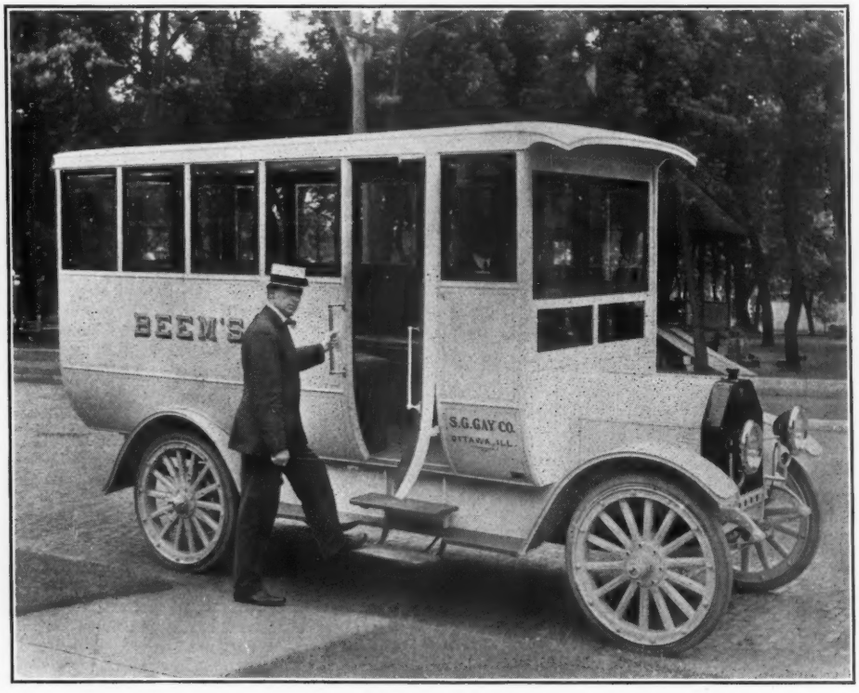
Fig. 9. Velie Three-Ton Structural I-Beam Frame
Built up from rolled steel of I-beam section with subframe members of channel section

forward to reduce the turning radius. Through this feature lower body carriage is obtained than would be possible otherwise. It also provides ample clearance for the radius rods, chains and springs. The flange width is increased at the point of offset to provide proper strength.

The United States 3-ton frame, Fig. 7, is an illustration of the structural or rolled channel frame, combined with steel castings and a construction in which each unit is mounted as flexibly as possible. The forward three cross members are steel castings the fourth of I-beam section rolled steel and the rear of channel shape rolled steel. The front spring hangers are formed integral with the front cross member, which is in two halves, bolted together at the center.

The Knox tractor frame, Fig. 8, is made from rolled steel of channel shape; however, it is comparatively short, as the rear axle is attached to the frame by means of cantilever rear springs. Thus the frame merely extends far enough to carry the support on which the spring pivots. The illustration shows the combined jackshaft and brake support bracket and other parts which are riveted to the frame. Large gusset plates are used at the front and rear end, while the front cross member extends to each side and is curved to form the bumper.

One-Ton International in Leather Delivery Work
In the service of Norman P. Shaffer & Company, wholesale dealers in leather findings and shoe store supplies, in Chicago



A Fourteen-Passenger Jitney 'Bus
Operating on the streets of Ottawa, Ill., and made by the S. G. Gay Company, Ottawa, Ill. The 'bus has worm-drive rear axle; 36 x 3½ in. front and 36 x 4 rear, solid demountable tires; electric lights: and seat so arranged that driver can receive fares as passengers enter.

The 3-ton Velie frame, shown in Fig 9, is built up from rolled steel of I-beam section, with subframe members of channel section. It is of the rigid type well braced, and provided with heavy gusset plates. The front cross member is bolted in position for easy access to the power plant. Diagonal braces of channel section are placed between the third and fourth cross members for stiffening the frame. It is claimed that the I-beam section provides a much heavier and stronger frame, due to greater width of the flanges.

Structural steel of channel of I-beam section is brought from the steel mills in stock lengths. It is usually manufactured from Bessemer steel, afterward subjected to open hearth process in which it is saturated with carbon, to certain specifications for certain uses.

Pressed steel is purchased in sheet form, cut to the proper shape in the flat and then pressed into channel form under great pressure. It is made of steel rolled into sheets; it is made somewhat closer grained, and there is no breaking of the flake in the rolling operation. The pressed steel frame permits of greater simplicity in assembling, since parts can be easily bolted or riveted to it.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

Activities of the Motor Truck Association of Philadelphia

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COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

MOTOR TRUCK MEN RESUME SESSIONS

E. B. Jackson Will Continue as President of Association Until Expiration of Term

ACTIVITY on the part of the Philadelphia Motor Truck Association was renewed when the first monthly meeting of the fall and winter season was held at the Hotel Adelphia, a banquet preceding the offerings of the speakers.

The important announcement was made that E. B. Jackson, who has lately removed to New York City, will continue to discharge the duties of president of the association until the expiration of his term. The announcement was received with cheers.

In the absence of Mr. Jackson, Vice-President Emlen S. Hare presided. He announced that the board of directors had acted favorably on a plan to admit to membership in the association owners of motor trucks and superintendents of delivery.

The next meeting will be held at 6.30 p.m., at the Hotel Adelphia, Wednesday, October 20th. All owners and superintendents are cordially invited to attend. Dinner will be served at small cost, and the meeting to take place immediately afterward.

A. E. I. Jackson, attorney for the association, explained to the members various problems growing out of the law on dealers' license tags, and responded to questions.

Municipal Court Judges Raymond MacNeille and Eugene C. Bonniwell discussed problems growing out of the effort to develop better systems for dealing with the questions of juvenile dependency. Dr. E. J. Cattell wound up the affair with a most informative discussion of the financial ascendency of the United States that has followed the war in Europe.

W. H. Metcalf, Secretary, read a report as to the amount of good that had been brought about by the reports of members on abuse and misuse of trucks.

Since these reports were instituted sixty-seven owners have received notice from the Secretary's office of abuse and misuse of their trucks on the street; nineteen, reckless driving; fourteen, tires in bad condition; seventeen, very much overloaded; five, number of men on seat with driver; two. drivers apparently intoxicated; ten, miscellaneous reports.

Murray Herron, who has been connected with the Detroit branch of the Stewart-Warner Speedometer Corp., for over a year, has become connected with the Metal Body Co., Springfield, Mass., as comptroller.

AUTOMOBILE POSTAL DELIVERY PROVES ECONOMICAL

The present screen wagon service in different large cities of the country, furnished by private contractors, promises to give way to the automobile, government owned and operated. In Chicago, it is figured, the service to and from railroad stations annually, by street cars to sub-stations and to outlying points, costs $370,000. The government can give the same service for $209,000, the government buying the automobile equipment for $195,000.

The extra cost of the first year is estimated at $35,000 larger than for service by private contractors, while a saving of nearly $50,000 will come in the second year.

In St. Louis, it is estimated, a saving can be effected of $66,000, the government equipment costing $62,000. This class of service has already been authorized for Detroit.

The estimates upon which the saving is based contemplates the use of the same automobile equipment for collection and for parcel post service. Similar service is now contemplated for Toledo and Columbus, Ohio; Fort Dodge, Iowa; Cincinnati and Indianapolis, with a probable extension to other cities in Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa and Missouri.

Motor rural free delivery service has been authorized by routes as follows: Alabama, 14; Arkansas, 4; California, 29; Colorado, 3; Delaware, 20; District of Columbia, 2; Florida, 22; Georgia, 127; Illinois, 3; Indiana, 14; Iowa, 40; Kansas, 3; Kentucky, 3; Louisiana, 1; Maryland, 3; Mississippi, 3; Nebraska, 1; Oklahoma, 136; Oregon, 1; Pennsylvania, 16; Texas, 59. Total, 524.

DU PONT POWDER COMPANY CHANGES NAME

E. I. duPont de Nemours Powder Co., of New Jersey, has sold and transferred its business to E. I. duPont de Nemours and Co., of Delaware, the main office being in Wilmington. This new corporation has been organized for the purpose of taking over and carrying on the business, and assumes all liabilities of the old company except capital stock and funded debt, and will carry out all contracts of the old company. There is no change in the personnel of the management operations or methods of handling the business. Capital stock to the amount of $120,000,000 will be issued. This well-known powder company is also the maker of other things, its chemical business having entered many industrial lines, and the Du Pont Fabrikoid Co., which it controls, is making exceptional progress and the enlargement of its productive capacity has been continuous as a result of the steadily increasing sales.

Merchant & Evans Co. will, on January 1st, remove from 517 Arch Street, Philadelphia, Pa., to a new and enlarged Philadelphia general office, manufacturing and warehouse plant at 2019-35 Washington Avenue, with a floor area in excess of 75,000 sq. ft.

Republic Truck for Rotary Club Outing

Made by Republic Motor Truck Company, Alma, Mich. The Richmond, Va., distributors, King & Wright, have used the truck for Rotary Club outings, advertising both the truck and the Rotary Club, which is a national organization.

The CCJ leads in circulation, advertising and prestige

STARTING AND LIGHTING FOR TRUCKS

By RUSSELL HUFF

Consulting Engineer, Packard Motor Car Company, President-Elect Society of Automobile Engineers

AS an accessory to the motor truck, the electric starter has economic advantages that far offset the initial cost and trivial maintenance expense of the system, according to Russell Huff, consulting engineer of the Packard Motor Car Co., and president-elect of the Society of Automobile Engineers.

"There are many notable advantages accruing from the use of the modern self-starter which many truck owners lose sight of" says Mr. Huff. "The starter of to-day has been so perfected, that when once properly installed on the truck, it may be forgotten.

"A casual inspection tour of any city will quickly establish the fact that most drivers allow their motors to stand with the engine running idle for long periods. This is expensive because the idling of the average three-ton engine costs the truck owner one-half gallon of gasoline an hour and a great deal of engine oil.

"This idling produces a more rapid deposit of carbon in an engine than any other one thing. The high vacuum caused by idling continually sucks oil up past the piston rings, onto the walls of the cylinder and the tops of the pistons. After a long period of idling the excess of oil deposited above the piston burns up when a load is applied to the engine—part of it appearing at the exhaust in the form of blue smoke and the rest remaining on the cylinder walls and piston in the form of solid carbon.

"Excessive idling, especially in cold weather, is oftentimes the result of difficulty in starting. A driver will allow his engine to run in this manner for an hour or more in the wintertime rather than take the chance of wasting another hour in his efforts to start the engine after it has become cold.

"The electric starting system has the great advantage of being a constant source of electricity for keeping the battery charged. Electric headlights and electric swivel searchlights allow the driver and helper to make faster deliveries after dark, by giving them a good light to drive by and a searchlight for picking out streets and house numbers.

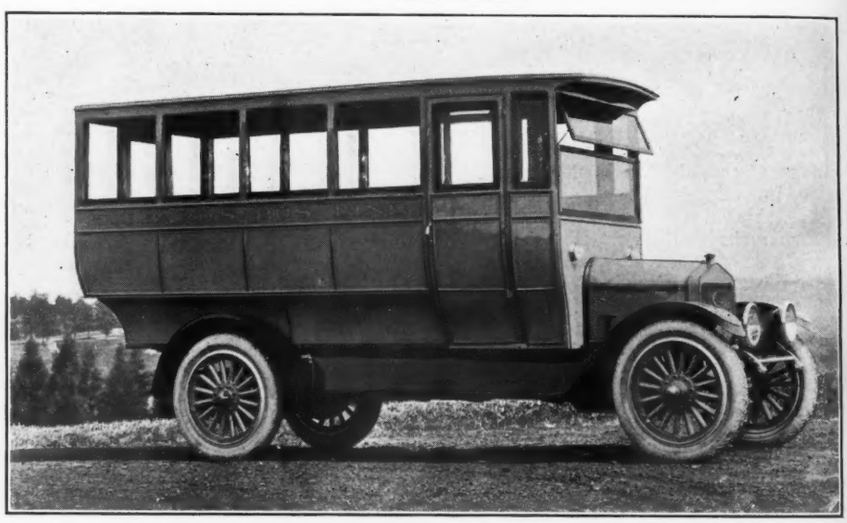
"Electric lights can be cheaply installed in express bodies, van bodies, 'bus bodies and any other types where good lights are a convenience.

"A distinct economy results by saving the time of the driver through a device which positively starts his engine quickly and efficiently, in either hot or cold weather. The time saved by having electric lights for faster driving and faster delivery work is considerable, and there is an important reduction of gasoline, oil and carbonization costs. The starter also is cheap, positive insurance against back kicks, broken arms, back fires and burned trucks."

Federal Commercial Car Used by Milkman

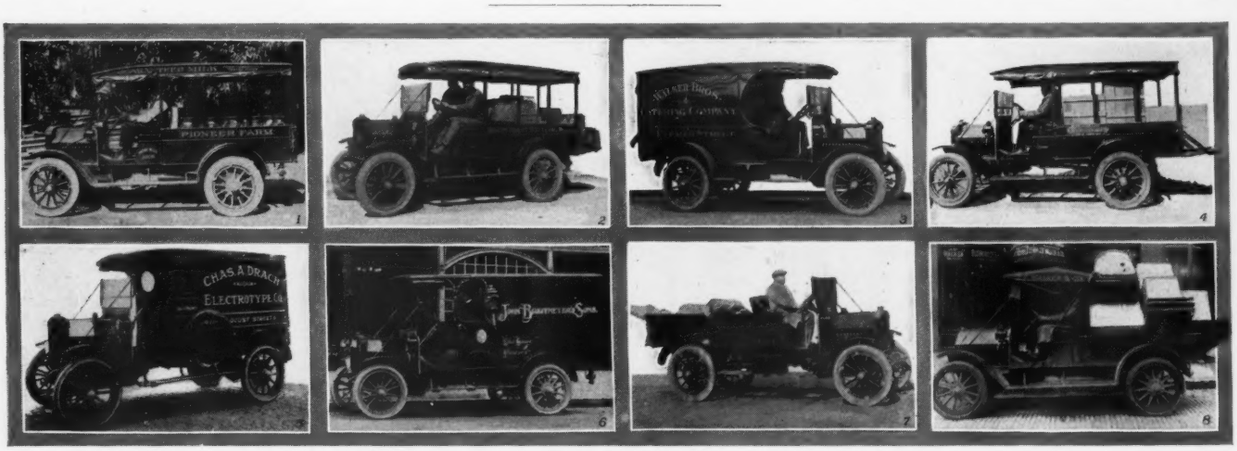
John Merrell, Agawam, Mass., has used this machine for two years, the only replacements being tires and chains. He is well satisfied and could not handle his business in any other way. It is here shown loaded with empty cans for a thirty-mile run in the afternoon, to gather the milk. It is used seven days a week and makes fifty to sixty miles some days.

Usona Mfg. Co., Inc., New York City, producer of Kwit-Lite products, has opened a branch office and warehouse in the Wells-Fargo Bldg., San Francisco, Cal. This is the fourth office to be opened since February, the others being in New York City, Toledo, and Windsor, Canada.



Chase Trucks Used by 'Bus Line Company

Herewith is shown one of the five Chase trucks used by the Hubbard 'Bus Line Company, of Massena, N. Y. The trucks are made by the Chase Motor Truck Company, of Syracuse, N. Y. Chassis is the fifteen hundred pound Model T. Machine is geared for a maximum speed of 25 m. p. h.



Commerce Cars Are Very Versatile

These cars are made by the Commerce Motor Car Company, Detroit, Mich. 1. Model SH in service of Pioneer Farm, Beverley, Cal., for delivery of milk and cream. 2. In the service of the Independent Bottling Works, Detroit, Mich. 3. Used by Walker Brothers Catering Company, Detroit, Mich. 4. Used by Seamless Rubber Company, New Haven, Conn. 5. In service of Chas. A. Drach Electrotype Company, St. Louis, Mo. 6. Florist's car for John Breitmeyer's Sons, Detroit, Mich. 7. In service of Mason Reef Company, Detroit, Mich. 8. In service of J. F. Walker & Company, Knoxville, Tenn.

The CCJ leads in circulation, advertising and prestige

Truck Protection

FOR the lighter class of commercial vehicles, demanding regular, uninterrupted service at high speed, the Firestone side-wire removable motor tire is the ideal equipment.

Note from the cut that this tire is soft rubber all the way down to the steel base. There is no hard rubber to detract from resiliency. This is the original Firestone solid tire construction, although considerably modified to meet the more extreme service of the present day. The tire is cured in the heavy steel channel and with the additional retention of the hard steel wires there is no possibility of the tire creeping or loosening in the rim.

There is a Firestone Tire for every road, load and condition of service. Each is designed for highest efficiency in that service for which it is adapted. Telephone the nearest Firestone Service Station for details and prices.

Firestone Tire and Rubber Co.

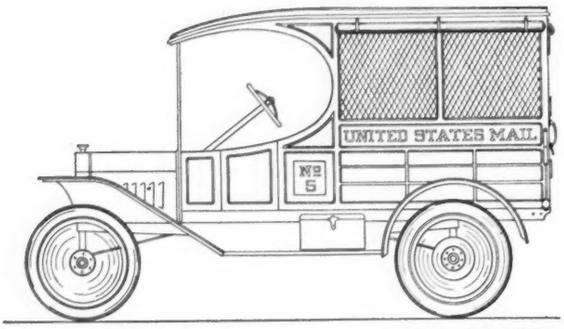
"America's Largest Exclusive Tire and Rim Makers"

Akron, Ohio—Branches and Dealers Everywhere

Commercial Cars for Rural Free Delivery

By LEE L. ROBINSON

THE latest innovation of the postoffice department, the motorizing of the rural free delivery service as fast as road conditions will permit, is now an established fact. The department has worked a scale of salaries for rural carriers who use automobiles and the increases which have resulted average from twenty to fifty per cent., these increases being in consideration of the additional expense to which the carriers will be put in providing their own machines.



Type of Body Specified by Government for Rural Mail Service

The highest salary paid a rural carrier on a motor route will be $1800 per year, the lowest will be $1500. Despite the additional salary paid carriers on motor routes, the department expects the new service to prove economical as well as much more efficient. This will result from the fact that one carrier, in many instances, will be able to cover with an automobile a route twice as long as that covered by a carrier with a horse-drawn vehicle. The national organization of rural letter carriers, backed by a number of Congressmen, is expected to vigorously oppose the change from horse-drawn vehicle to automobile principally on the grounds that many now in the service will be eliminated by the change.

These protests, however, are expected to avail nothing. It is understood that the postoffice department has acted entirely within its rights in substituting automobiles for horse-drawn vehicles in the rural service, and that Congress can have no say as to the matter. But, the department says, there is no need for any rural carrier to become panicky over the change, as the substitution of automobiles for wagons will of necessity have to be made slowly and it will be a long time before the rural routes of the country are completely motorized.

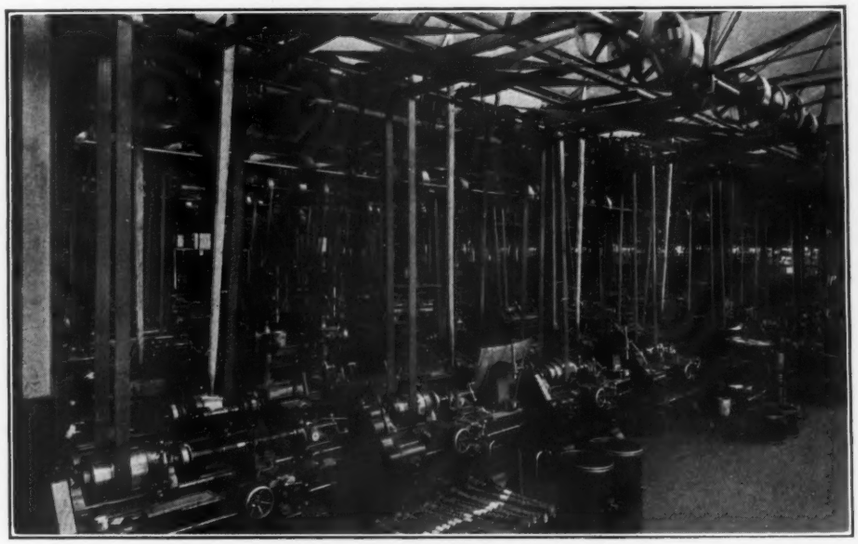
In the meanwhile, it is the plan of the department, not to hold examinations for additional rural carriers in the territories affected by the automobile order and, in this way, places can be found for many carriers who might otherwise be eliminated. Said an official of the department: "It is the desire of the Postmaster General to help all competent, faithful carriers, and if conditions result which tend to decrease the number of carriers in one locality efforts will be made to take care of them on other routes."

Two pioneer motor routes were put into effect on July 1, last, out of Quarryville, Pa., one 55.1 miles long and the other 56.8 miles. So successfully did they work that the number of routes was increased to 105 on August 2d. These 105 machines traverse a little more than 5500 miles of rural postroads daily except Sunday. It is considered certain that rapid increase of automobile mileage will be made during the coming fiscal year as surveys of special needs and conditions are being made in every state in the union looking to the introduction of this service wherever it will be advantageous to the rural public.

The department predicts that the rural mail auto will soon be as familiar in the great farming sections of the country as the present rural carrier's wagon. The routes now in operation by automobile are from 50 to 60 miles long. The time schedules carry from 6 to 8 hours. The automobile service has made it possible in some instances to extend considerably the old wagon routes. Automobile routes thus far authorized by the Postmaster General are apportioned as follows: California, nineteen; Florida, three; Georgia, twenty-eight; Oklahoma, forty-four; Louisana, one; Texas, eight.

It is expected that the average number of families served daily by automobile route will be three hundred, a number far in excess of the average by wagon route. This does not mean, necessarily, that each family on a route is served daily, as experience has demonstrated that farmers neither receive nor send mail every day. Frequently, also, several families in one neighborhood will have one box or "nest" into which the mail for all of them is placed, requiring but one stop by the carrier. Carriers now in the service, who hope to qualify as motor carriers, must do so before the Civil Service Commission, as far as demonstrating their ability to handle a machine is concerned.

The Postmaster General has recommended to the Commission that those now in the service, who take examinations, be allowed a credit of three per cent. for their experience in handling mail. Soon the rural mail motor will be standardized. Now the temporary carrier may use any machine "with a carrying capacity of not less than 800 lbs. and a cubic capacity of not less than 80 cu. ft."



The Continental Forest

Part of the plant of the Continental Motor Manufacturing Company, of Detroit, Mich., which shows only a portion of the lathe and grinding departments of the Detroit plant—a veritable forest of belts and machinery. This particular view is of unusual interest in that it shows the systematic arrangement of machinery and the tremendous facilities possessed by this company for the manufacture of motors. Probably less than one-fourth of the machine shop proper is shown here, while in Muskegon, Mich., is another plant of approximately the same size and of equal capacity, similarly equipped. Five additions to the two factories are now under construction and thousands of dollars worth of new machinery will be installed and put to work as soon as they are completed.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

WHITE TRUCKS

Awarded the GRAND PRIZE

BY THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION AT SAN FRANCISCO

THE ONLY GRAND PRIZE—THE HIGHEST AWARD FOR MOTOR TRUCKS

Was conferred upon White Trucks by the Superior Jury of Award, as officially announced by the Secretary of the Jury under date of August Second.

This is the ONLY GRAND PRIZE received by any motor truck at the Panama-Pacific International Exposition.

This decision of the Superior Jury of Award reflects the opinion of the largest users of motor trucks throughout the world—and is in accordance with the actual service results of motor truck experience. The points of merit upon which the Grand Prize is awarded are identical with those that have determined the selection of White Trucks by America's foremost firms in every line of business.

White supremacy in the motor truck industry is thus recognized by the highest award that can be bestowed by the greatest exposition the world has ever known—just as this supremacy has been recognized by motor truck users for many years.

REGARDING OTHER CLAIMS

The decision of the Superior Jury is final in the matter of Exposition awards. Hence any announcements of other motor truck manufacturers, claiming to have received the Grand Prize and Highest Award for motor trucks at the Panama-Pacific International Exposition, are automatically denied by this decision of the Superior Jury of Award.

THE WHITE COMPANY
CLEVELAND

Largest Manufacturers of Commercial Motor Vehicles in America

Parcel Delivery Companies Make Good Record With Trucks

By GEORGE W. GRUPP

WITH the constant migration of inhabitants of the thickly populated districts of Buffalo into its outskirts, a new problem confronted the local delivery companies. And as the majority of the stores do not own their own delivery wagons, the problem was one which concerned these companies most.

It was not the down town sections which bothered these companies, the horse could handle that, but it was the outskirts. Here the horse was altogether too slow and besides could only make one delivery a day. People protested against this kind of service and thus the horse was forced out of business and the commercial car took his place—the only solution for efficient service. And, in order to keep pace with the steady growth of the city, some twenty odd trucks are now operated by ten delivery companies in Buffalo.

Most of these companies render their services to the retail and wholesale houses on a yearly contract price. For those who have but little delivering done, or who use them only during a rush season or "sale," the price for such service is so much a pound or hour and is determined by the character of the goods, the volume and if it is for forwarding service, etc.

Every delivery company has its sorting station, and to this point all parcels, packages, barrels, boxes, etc., collected from the stores by large wagons, are brought for sorting and routing. Each piece is placed in its respective route bin and each bin is assigned to a given truck which covers a definite section.

Then there is another service which they render to the stores, a small fee being charged—the collecting of C.O.D. deliveries. The moneys collected are turned into the office each night by the driver and the delivery company in turn, every two or three days, sends a check to the stores for such moneys, which are itemized on the back of the check or on a separate slip.

general forwarding business for out-of-town concerns.

This firm has divided the city into fourteen routes and one horse vehicle is supposed to care for each route. Of these fourteen routes, the two trucks, which have been successfully operated for the past year and a half, care for four. Thus each truck does the work of two wagons and five horses in relay. Where a horse and wagon would leave the sorting station at 9 a.m., it would not return until 3 p.m., whereas the trucks are back at 12 m.

Buffalo Merchants' Delivery Company Uses a Ford

A pile of three thousand bundles and parcels in this company's sorting station, awaiting sorting and delivery. These represent a day's delivery from one store.

The Delivery Company

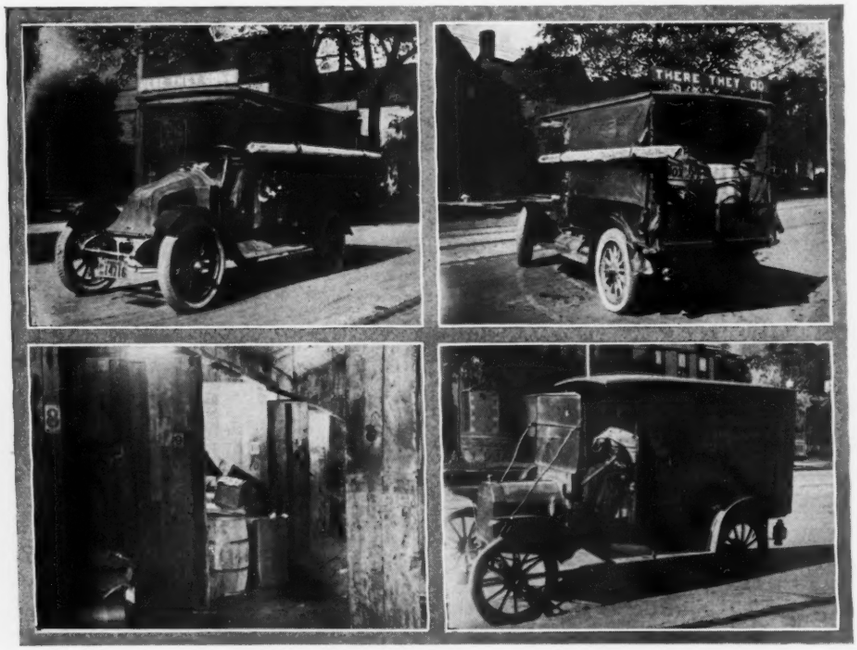
The "Delivery Co.," the oldest in Buffalo, makes 2000 deliveries or about 3500 packages a day with its two 1500-lb. Stewart trucks and ten route wagons, for 300 local wholesale dry goods and supply houses and retail stores. This concern also does a

These two trucks, its owners claim, paid for themselves and made $1000 clear profit the first year of their operation.

The owners itemize the cost of operation, per truck, per day as follows:

Depreciation	$2.25
Driver	3.00
Helper	1.25
Gasoline	1.80
Oil	.20
Insurance, fire, liability, etc.	.46
Interest on investment	.34
Repairs, tires, new equipment, etc.	2.10
Total cost—70 miles	$11.40
1 mile	.162

As each truck delivers 500 packages a day, and the cost of operation is $11.40, they find that it costs $.022 to deliver each package.



Stewart and Ford Used by "The Delivery Company," of Buffalo

The fifteen hundred pound Stewart truck is shown in the upper views. The two signs, "Here They Come" and "There They Go," at the front and back of the truck, are evidently indicative of the quick service which this company maintains. The lower left illustration shows the sorting bins in this company's sorting station. The Ford delivery cares for this company's Lackawanna, N. Y., trade.

Buffalo Merchants' Delivery Company

The Buffalo Merchants' Delivery Co. possibly delivers more packages than any other in Buffalo, as it makes 2500 deliveries of 4500 packages a day for 200 local stores. Five Ford deliveries are used for their South Park, Central Park, Kensington, Black Rock and Pine Hill routes. Each truck costs them $37.50 a week or $6.25 a day and this includes the driver's and helpers' wages. Each truck covers fifty miles a day and is able to replace two and one half horse vehicles.

An itemized cost of operating each truck per day is as follows:

Gasoline	$.75
Oil	.20
Interest	.10
Insurance	.30
Driver	3.00
Helper	1.00
Repairs, etc.	.50
Depreciation	.40
50 miles	$6.25 per day.
1 mile	.125

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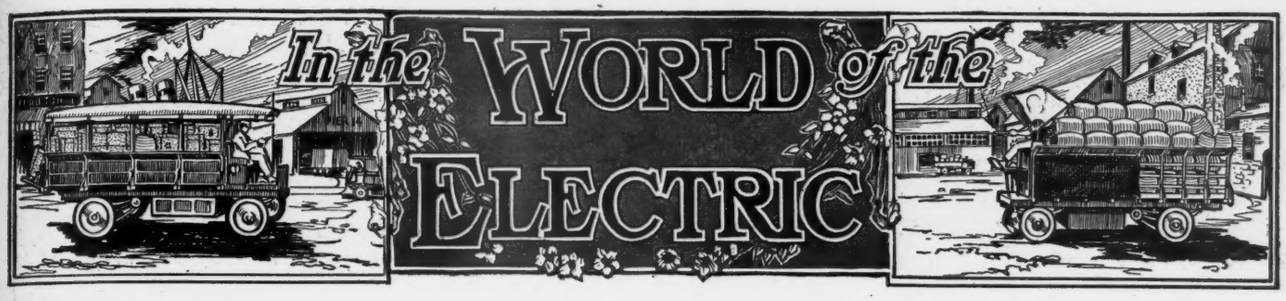

Sixth Annual Convention of Electric Vehicle Association of America, at the Hotel Statler, Cleveland

THIS, the sixth annual convention of the E. V. A. has been planned essentially as a business convention. The general committee decided with Samuel Scovil that instead of mixing pleasure trips with the business sessions, two days, the 18th and 19th, would be devoted exclusively to business, and the 20th be devoted to trips to various points of interest, factories, etc., for those who cared to remain. In this way the very busy man could spend two days profitably at the sessions. These are followed with papers and discussions on live topics of interest to electric vehicle manufacturers, central station men, battery makers, and all connected with the electric vehicle industry.

The following is the program, and also very complete extracts of such papers as were received up to the time of our going to press. Further details and extracts of the other papers will appear in our next issue.

"INDUSTRIAL TRUCKS IN THE SERVICE OF THE PENNSYLVANIA RAILROAD COMPANY." By Mr. T. V. Buckwolter, Pennsylvania Railroad Co.

"THE ELECTRIC TAXICAB." By Mr. I. S. Scrimger, Secretary and General Manager, Detroit Taxicab & Transfer Co.

"THE EDISON BATTERY SERVICE SYSTEM." By Mr. Willis M. Thayer, Manager Vehicle Sales, Hartford Electric Light Co.

"THE FUNCTION OF THE ELECTRIC GARAGE." By Mr. R. Macrae, of the Commonwealth Edison Co., Chicago.

"COMPARATIVE DEVELOPMENT OF GENERAL POWER AND COMMERCIAL ELECTRIC VEHICLE LOADS AND FUNCTION OF POWER SALESMEN AS ELECTRIC VEHICLE SOLICITORS." By Mr. H. H. Holding, General Car Representative, and Mr. S. G. Thompson, General Electric Vehicle Representative, Public Service Corporation of New Jersey.

"PROBLEMS WE ARE FACING AND HOW THEY MAY BE MET." By Mr. George H. Kelly, Secretary Baker Rauch & Lang Co., and President Electric Automobile Manufacturers' Association.

"FIELD FOR THE SMALL ELECTRIC DELIVERY VEHICLE." By Mr. Charles A. Ward, Secretary-Treasurer Ward Motor Vehicle Company.

"ELECTRIC VEHICLES IN MUNICIPAL SERVICE." By Mr. Arthur J. Slade, Consulting Engineer, and Mr. R. Duval Dumont, New York Edison Co., New York City.

"THE COMPARATIVE OPERATION OF ELECTRIC AND GASOLINE MACHINES IN SAME SERVICE." By Mr. T. D. Pratt, President Motor Truck Club of America, and Mr. W. J. Miller, Public Service Corporation of New Jersey.

In addition to the above mentioned papers valuable Reports of the Association's Officers, 16 Sections, Standing and Special Committees, will be given.

THE FUNCTION OF THE ELECTRIC GARAGE*

BY looking in the dictionary it will be seen that the word "garage" is derived from the French word "garer" the primary meaning of which is to moor a ship to the dock, so that literally, an electric garage is a mooring place for electric vehicles.

The object of this paper, however, is to show that the literal meaning does not apply, and that the place from which an electric vehicle is operated should be something more than a place in which it may be tied up over night.

Usually an electric garage is a place where electric vehicles are housed, charged and washed at a fixed rate per month without regard to the amount of work that the vehicle is called upon to do, but this is not all that a garage should be. The function of the garage is not only to give the vehicle proper care, but also to keep it in proper working order. In other words, its function should be to bring the electric vehicle within the reach of all vehicle users.

To perform this function the garage must be provided with whatever equipment is necessary for making all minor repairs at a reasonable rate and without unnecessary delay, and must also be in a position to supply electric power at a reasonable rate. In addition, therefore, to being a place in which the vehicle is housed, washed and charged, an electric garage that performs its functions is a place from which the vehicle can be operated economically. It relieves the vehicle manufacturers of the expense of maintaining a repair shop in connection with every selling agency and the vehicle user of the expense and annoyance of having the vehicle tied up while a bolt or a small piece of casting is being obtained from a distant part of the country.

With regard to the electric vehicle itself, operating data can now be produced to show that it is a good as perfect if what we are asking for is a vehicle that is in every respect superior to the vehicles now used for carrying on our street traffic. Much has been said about the electric vehicle in its own special field and the necessity of making a technical investigation of the character of the work to be done before recommending the use of electric vehicles, but we now know that such an investigation is unnecessary, that we need not ask whether the hauls are long or short, the streets good or bad, or whether or not the vehicle has to stand for half of the day at some railway station. It is only necessary to inquire about the garaging facilities and if the answers to these inquiries are satisfactory we need not hesitate to recommend electrics for any kind of street traffic.

It must be admitted, however, that garaging arrangements are at present generally unsatisfactory. The various schemes of battery maintenance and battery service that we hear spoken about and the claim that electric vehicles will never be entirely successful until some such maintenance systems are established, go to show that at the present time batteries are not being properly maintained. In other words, that the garages are not performing their functions properly. The battery, however, is not the only part of the electric vehicle that has to be maintained, and a battery maintenance system alone will not enable the owner of an electric vehicle to operate it to the best advantage.

The lack of adequate garaging facilities cannot all be laid to our garage managers. Considering how little encouragement the electric garages have received from the manufacturers and the central station men, we may rather be surprised that our garage service in general is as good as it is. Where we have public garages they have sprung up to fill a want which the users of electric vehicles recognize, but which the vehicle manufacturers and central station companies, generally speaking, have not recognized. The shortcomings of the garages are almost entirely due to a general misconception of what the functions of the garage should be and to the fact that those who are interested the most in the development of the electric vehicle industry have not fully realized that public garages are necessary in order that the electric vehicle may become generally available. Had the need for suitable garages been clearly recognized at the outset it is quite certain that the electric vehicle industry would not now be lagging so far behind its competitors. Even now when urging the claims of the electric garage the question is sometimes asked "What have the garages ever done for the development of the industry? If a man wants to operate an electric vehicle why go to a public garage? Why not start a private garage?

There are two reasons why the small garage cannot perform the functions of a garage satisfactorily. The first is, that it cannot afford to maintain an adequate equipment, and the second is the comparatively high rates per kilowatt-hour that the small garage has to pay for electric power, whether the electricity is generated

*Extract of paper presented by R. Macrae before the Sixth Annual Convention of the Electric Vehicle Association of America, Cleveland, Ohio, October 18-19, 1915.

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on the premises or is obtained from the Central Station Company.

In order to start these small garages, however, it has been customary in some cases to make claims for the electric vehicle which may sound plausible to those who know nothing about the subject but are merely absurd to anyone who is familiar with motors, batteries and electric meters. We read, for instance, that "No skilled labor is necessary to operate an electric vehicle, that in charging all that need be done is to close a switch, and that automatic apparatus will do the rest, that the cost of operating electric vehicles is independent of the mileage, that the bill for electric power will not be over $7 per month, and so on." Such claims create the impression that it is not necessary for a man to know anything about electricity in order to qualify as manager of an electric garage, and the result is that less intelligence or less common sense is exercised in the operation of electric vehicles than there is in the operation of any other class of apparatus for which the central station supplies power.

In more than nine cases out of ten, when the owner of a private garage who makes a complaint about the size of his power bill is asked how much electricity is used each night for charging, he will answer by asking "Do you mean what button I start it on?" or some such question, although an electric meter stares him in the face every every time that he enters his so-called garage.

With reference to the claim that no skilled labor is needed, one of the largest commercial vehicle users in the west was told when he first started to use electrics that is was not necessary for him to hire new men, that the men who were looking after the horse-drawn vehicles would in a day or two know all that there was to learn about operating electric vehicles. How far this claim was justified may be judged from the fact that during the first winter in which the vehicles were in operation, as many as fifteen broken down vehicles would on some days be towed back to the barn. Towing was in fact so much a part of the regular operation that the question has been asked why it was customary to operate electric vehicles in pairs with a rope between them. A teaming contractor located a short distance from the place in which these vehicles were kept, when asked if he knew how this company was getting along with the electrics, replied that he thought they had discontinued the use of the electrics as he had not seen any of them being towed by for some time. They had not, however, stopped using the electrics; they had discharged the barn boss and had hired a technical man to fill his place. What had up to that time been merely a barn then then became a garage, and as a result the company is now entirely satisfied that electric vehicles are better than any other type of vehicles for city traffic.

I will give just one instance to illustrate why garages are needed. Two or three years ago the operator of a 4-ton truck who had thrown out his private charging plant because the bills for electric power were too high and because the night watchman who was looking after the motor generator could not tell that anything was wrong until he saw the apparatus smoking, took the truck to a public garage located six miles away. The truck was operated from this garage for over a year, twelve miles, or about one half the daily mileage being made in going to and from the garage. Instead of discontinuing the use of the electric, as he might reasonably be expected to do under the circumstances, he bought three more electrics. He did not do so, however, until after he had made different arrangements for garaging. Scores of instances might be given of cases where electric vehicles have been discarded, the owners thinking that the vehicles themselves, and not the garaging arrangements, were at fault.

When the public is made to understand that an electric vehicle in order to be successful, must be operated under the supervision of someone who knows what an electric vehicle is, we will no longer see the owner of one of these cars taking it to a livery stable or a gasoline garage under the impression that it will there receive the right kind of attention.

The second factor which makes it difficult for a small garage to perform the functions of a garage properly, namely, the higher cost of electric power in small garages, cannot be left out of consideration when electric vehicles are to be operated in competition with vehicles using other kinds of power.

Sometimes we hear it stated that the cost of electricity is so small a part of the total cost of operating an electric vehicle that it need hardly be taken in consideration when advocating the use of electric vehicles.

In some cases this is true, but in the majority of cases it is not. Where the vehicle is used as a toy the cost of electric power is seldom a consideration that will prevent the electric from being used, and sometimes also when used for commercial purposes the cost of power is a relatively small item. For instance, a 1-ton truck doing only as much work as could be done with one horse should not use over 150 kilowatt hours per month, which at 5 cents per kilowatt-hour, would be $7.50 per month, or only a little more than hoof pads for the horse would amount to. This same vehicle, however, if operated to its full capacity making 50 or 60 miles every day, might use $40 worth of electricity, which would be an item in the cost of operation second in importance only to that of the wages paid to the driver.

Five cents per kilowatt-hour is as low a figure as the average garage can now afford to sell electricity for and lower than the small garage as a rule can sell it for.

The majority of central stations now make exceptionally low rates for electric power when used in large quantities and with certain restrictions in regard to the manner in which the power is used, but the small garages are not, as a rule, in a position to take advantage of these low rates.

Sometimes also there is an avoidable waste of electricity in small garages for which there would be no excuse in a large garage. Over-charging of batteries is sometimes carried on as if electric power did not cost anything, and frequently batteries are charged from circuits whose voltage is almost high enough to charge twice as many cells, thereby wasting one-half of the energy in resistance coils. While it is true that the cost of electricity is gradually going down in the most of our large cities, there is no immediate prospect of its going so low as to make such a waste of power seem justified under any circumstances.

It is evident, therefore, that in order to get the best that is in the electric vehicles out of them, that we must operate them from large and properly equipped garages instead of trying to maintain a separate garage for each vehicle.

DATA ON THE HARTFORD ELECTRIC LIGHT COMPANY'S EXPERIENCE WITH THE BATTERY EXCHANGE SYSTEM FOR COMMERCIAL VEHICLES

Paper Read By WILLIS M. THAYER

A BRIEF review of the Hartford Electric Light Co.'s experience which leads up to the development of the Edison Battery Service System, will be of interest.

In the old days of the Electric Vehicle Co., as far back as 1900, the Hartford Electric Light Co. purchased and used a number of electric vehicles, both commercial and passenger. There has been no time since when this company has been without some electric vehicles of each of these classes.

The Lighting Company as Agents for Electric Vehicles

During the period up to 1910, passenger electric vehicles were represented by a number of agents and many placed in use. As a rule, these same agents represented commercial electric vehicles also, but made no effort to sell them and had no information at their disposal which would assist them in doing so. The Hartford Electric Light Co. decided that the commercial electrics would never be fairly represented in this way. The company decided to take the agency for a commercial electric and considered that the best results would be obtained by confining this agency to one make of vehicle only. The company, therefore, took the agency for General Vehicle Co. trucks early in the year 1910 and purchased three trucks, one of 1000 lb. capacity and two of the 1-ton size, which were received in July, 1910. One 1-ton car was placed in the hands of the vehicle department for demonstrations which were made without charge wherever possible.

The Boston Branch Grocery was the first customer to buy an electric truck. Their first vehicle was of the 1000-lb. size, with panel body, and went into service on November 1, 1910. This car is still giving most satisfactory service and has covered 46,760 miles up to August 1, 1915. The Boston Branch Grocery is now the largest user of electric trucks in Hartford, with eleven G. V.s, all of the 1000-lb. and 1-ton sizes, which have replaced all of the original equipment containing both horses and gas cars.

Before battery service became the decisive advantage, the Hartford Electric Light Co. furnished free garage and charging current for a period of six months on all new cars. Fourteen trucks were sold up to December 1911, all equipped with standard lead batteries and operated in the usual way. These vehicles proved most satisfactory. It was found, however, difficult to cover the necessary routes with snow on the ground or other unfavorable conditions and two batteries were used in some of these vehicles during the winter of 1911-12. These batteries were handled in the individual trays and exchanges made in less than 10 minutes.

The first outline of battery service is contained in the following letter, five hundred copies of which were sent to Hartford firms on November 1, 1911. The letter appeared as follows:

Hartford, Conn., Nov. 1, 1911.

Gentlemen:

Another striking advantage offered users of General Vehicle Co. electric wagons, by the Hartford Electric Light Co., is continuous battery service. You can contract with

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us to furnish battery service for your General Vehicle Co. trucks for any mileage. One hundred miles, per day, offers no difficulty.

The price of this unlimited service is based on the mileage, and with charging current included is no greater than the charging current alone for the limited service given with some other types of batteries.

Your truck can be kept on your own premises and no provision made for charging. You are entirely relieved from any responsibility or care of batteries.

This letter continues with further data on electric vehicles and is signed, The Hartford Electric Light Co.

The plans for putting this "service" into practical operation were completed early in 1912.

The Eagle Dye Works Co. purchased the first car for operation under this system. This car was delivered and went to work on June 5, 1912. All cars previously sold were changed over for operation under the "service" as rapidly as possible. The following is a list of the cars in use June, 1915, with the miles traveled that month and total miles traveled to date:

June 1915.

Number of trucks in use	64
Miles for month	47,615
Total miles to date	1,232,967

Equipment for Battery Service

The customer purchases trucks without batteries under the Battery Service System, as developed by the Hartford Electric Light Co. The company buys the batteries, charges and installs them in the customers' trucks. The equipment required by the company consists of batteries, the means for charging the batteries, and the apparatus for placing the batteries in the customers' trucks. The odometers on the trucks are also a part of the company equipment, with the cradles for the extra batteries. The "service" may be divided into two parts; the charging of batteries in cars at night and the charging of batteries out of cars. All charging of batteries in cars is done at the garage of the Commercial Electric Co., 1271 Main Street, where the company has installed charging equipment consisting of a Rotay converter, having a capacity of 850 amperes at 250 volts, and a motor generator set, having a capacity of 800 amperes at 250 volts. Both of these machines are designed for operating on the three-wire system. This equipment is operated by employees of the company from 11 p.m. to 7 a.m. The arrangement of rheostats, etc., is the same as described later under the exchange station equipment.

All batteries not charged in the cars are handled at the State Street Station. This station is in the direct current zone, and an ample supply of power available at 110-220 d. c. There are thirty-one sets of charging equipment installed. Each set is made up of one ammeter, one Sangamo ampere hour meter, one circuit breaker, and one switch. All batteries used on the "service" are Edison batteries of the standard size, recommended by the G. V. Co. for the different sizes of trucks and all the trucks on the "service" are G. V.'s, equipped with Universal cradles.

The Universal Cradle

The Universal cradle is an underslung battery container, secured to the car by four hooks, one at each corner, and is removable in one unit by raising the battery about 2 in., removing the hooks and detaching the battery leads. The vehicles are run into guides over hydraulic lifts for the purpose of removing the batteries. The hydraulic lift is made up of four cylinders, one at each corner of the platform, 3x6 ft. This platform in the lowered position is even with the floor. Each of these cylinders has an inside diameter of 6 in. and a maximum lift of 10 in. Each cylinder is connected to the city mains by a 1-in. pipe. The opening of one valve of the city mains, places a water pressure of 60 lbs. on each of these cylinders, which has proved ample to raise any batteries in use. The same pipe used for supplying the water to the lifts as is also used for discharging the water and lowering. This is done by closing the valve on the city main, and opening a valve on the discharge main. The original equipment contained a plunger valve on each of the four pipe lines to the cylinders. These valves have proved of small value. Each cylinder lifts the battery gradually into contact with the frame of the truck and automatically adjusts itself to varying heights of the truck frame from the ground, caused by worn tires or poorly distributed load.

Some form of platform truck is necessary for handling batteries when disconnected from cars. The Cowen truck used for this purpose has a height of 7 in. and is equipped with a platform which may be raised or lowered 1½ in. by the handle of the truck. The Cowen truck is placed on the platform of the hydraulic lift under the car from which the battery is to be removed. The hydraulic lift raises the Cowen truck into contact with the battery cradle and raises the whole equipment high enough to permit the removal of the hooks which secure battery to body of car. When hooks are removed and wires detached, the battery is lowered and removed on the Cowen truck to the charging room. The raised platform of the Cowen truck allows the battery to be run over skids in the charging room. The battery is then lowered on to the skids and the truck removed for other work. The exchange station is equipped with two complete hydraulic outfits for exchanging batteries. A single equipment is capable of making the complete exchange of battery in three minutes, or less.

Charging Methods

No instruments are used on the cars except odometers. All battery charging is based on the mileage covered with allowance for road conditions. When battery is removed from car the odometer reading is taken. The previous reading gives the miles covered and a slip is placed on the battery showing this distance. The man who places the batteries on charge uses this distance as the basis, multiplying same by a certain constant, depending on road condition, size of truck, etc. The Sangamo meter is set at the number of ampere hours required and runs back to zero, where the circuit breaker cuts it out. The voltage on individual cells is followed during the charging and serves as a check on the ampere hour meter. Some power is saved in this way. The Sangamo meter, however, is practical and accurate, and is certain to take the battery off charge before excessive charging occurs.

Batteries are cleaned with live steam at a pressure of 10 or 15 lbs. Distilled water is obtained from Barnstead water stills, operated electrically.

Operating Data

The introduction of "battery service" has tended to increase the mileage covered. The Boston Branch Grocery has a 1000-lb. car in use for fifty-six months, and has covered 46,760 miles, an average of 835 miles per month. The mileage of this car for July, 1915, was 1012. C. N. Dodge has

Battery service	1st year June, 1912 to June, 1913	June, 1913 2nd year to June, 1914	June, 1914 3rd year to June, 1915	3 year total
Operating labor	$2,775.85	$9,381.16	$8,727.70	$20,884.71
Operating material	467.37	1,221.85	1,286.61	2,975.83
Repair labor	0.00	2.94	29.84	32.78
Repair material	76.94	102.42	313.71	493.07
Repair service apparatus	7.10	892.62	1,161.15	2,060.87
Power	520.33	1,904.83	2,833.37	5,258.53
Total of operating items	3,847.59	13,505.82	14,352.38	31,705.79
Income	5,543.88	18,559.07	26,559.13	50,662.08

On Basis of per Cell per Month

2,568 cells in use at end of first year,	equal to cell months	13,332	
4,128 cells in use at end of second year,	equal to cell months	43,536	
5,094 cells in use at end of third year,	equal to cell months	56,982	
cells in use at end of three-year period,	equal to cell months	113,850	

	1st year	2nd year	3rd year	3 year total
Operating labor	$0.2082	$0.2155	$0.1531	$0.1834
Operating material	0.0350	0.0280	0.0226	0.0261
Repair labor	0.0000	0.0002	0.0068	0.0029
Repair material	0.0057	0.0023	0.0055	0.0043
Repair service apparatus	0.0005	0.0204	0.0203	0.0181
Power	0.0390	0.0437	0.0497	0.0461
Total of operating items	0.2885	0.2102	0.2518	0.2793
Income	0.4158	0.4263	0.4661	0.4449

On Basis of per Car per Month

32 cars in service at end of first year,	equal to car months	178	
46 cars in service at end of second year,	equal to car months	521	
62 cars in service at end of third year,	equal to car months	687	
cars in service at end of three-year period,	equal to car months	1,386	

Battery service	1st year June, 1912 to June, 1913	2nd year June, 1913 to June, 1914	3rd year June, 1914 to June, 1915	3 year total
Operating labor	$15.59	$18.006	$12.704	$15.068
Operating material	2.064	2.345	1.872	2.147
Repair labor	0.000	0.005	0.043	0.0237
Repair material	0.432	0.216	0.456	0.356
Repair service apparatus	0.039	1.713	1.690	1.496
Power	2.923	3.656	4.124	3.796
Total of operating items	21.615	25.923	20.891	22.876
Income	31.145	35.622	38.659	36.552

On Basis of per Average Mile

121,385 miles covered at end of	first year
365,968 miles covered at end of	second year
496,621 miles covered at end of	third year
983,974 miles covered at end of	three-year period

	1st year	2nd year	3rd year	3 year total
Operating labor	$0.0228	$0.026	$0.017	$0.021
Operating material	0.0038	0.003	0.002	0.0031
Repair labor	0.00	0.00	0.0001	0.0000
Repair material	0.0006	0.0003	0.0005	0.0005
Repair service apparatus	0.0000	0.002	0.002	0.002
Power	0.0042	0.005	0.005	0.005
Total of operating items	0.032	0.036	0.028	0.032
Income	0.046	0.053	0.054	0.051

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had a 750-lb. car in service forty-six months, and has covered 42,796 miles, an average of 930 miles per month. The miles covered by this car for July, 1915, were 1293. Eagle Dye Works Co. has operated a worm drive car for nine months, and has covered 10,782 miles, an average of 1198 miles per month. The mileage of this car for July, 1915, was 1313. One of Gaffey's Express 1-ton cars has been in service thirty-two months and has covered 35,032 miles, an average of 1095 miles per month. The mileage of this car for July, 1915, was 1251. The City Coal Co. has operated a 2-ton truck for eight months and has covered 7998 miles, an average of 1000 miles per month. This truck covered 1110 miles in July. One of the first 1-ton cars received by the Hartford Electric Light Co. has been in service sixty-two months and has covered 50,844 miles, an average of 820 miles per month. The mileage in July, 1915, was 1031.

During the month of December, 1914, cars on the road represented 1432 car days, 1284 exchanges of batteries were made, or 90 per cent. of the cars changed batteries every day. The number of cars stalled for any cause whatever was one for every fifty car days, that is, one car would get into difficulty every 1450 miles.

During the month of June, 1915, cars on the road represented 1594 car days, 988 exchanges of batteries were made or about 64 per cent. of the cars changed batteries every day. The number of cars stalled for any cause whatever was one car for every 477 car days, or the average car would get into difficulties once in every 14,310 miles. Twenty-four per cent. of the cars do not charge at night. The record of stalled cars includes every cause whatever, and does not necessarily imply exhausted batteries. An inexperienced driver might run his truck over into a back lot or over a bank.

Cost Recording

The accounts assigned to the vehicle and battery departments are arranged under the same general plan as all other company accounts.

The main accounts are carried under numbers and these accounts divided into sub-accounts, indicated by the main number, with—and sub-number. For instance, operating account is known as number 69, while operating labor under this account is 69—1. The accounts under battery service are divided as follows: The property account covering purchase of batteries; the property account covering purchase of service apparatus.

Operating accounts for the "service" are:

Operating Labor.—This account includes labor for exchange of batteries, filling, charging, changing solution and shift labor covering the whole twenty-four hours of each day.

Operating Material.—Includes distilled water, solution and any other material used directly for the batteries.

Repair Labor.—The labor for actual repairs to batteries.

Repair Material.—Any parts for repairs to batteries or any repairs made at factory.

Repair Service Apparatus. — Includes labor and material for repairs to charging sets, extra Universal cradles, odometers, Cowen trucks and all other apparatus used in handling batteries.

Future Extension of the Service

Battery service would seem to overcome the weakness of electric vehicles caused by the limitations of battery capacity. This is true, but batteries with greatly increased capacity would increase the practicability of the battery service system. A local truck owner recently ran nearly down to New Haven, a round trip distance of 70 miles On the return trip a stop was made at Meriden and the battery given a boost, for which the truck driver paid $.88. The truck owner afterward asked if this $.88 was not a part of the battery service for which he had already paid. This experience brings out the possibility of an arrangement with the central stations in surrounding towns under which any of the truck users could send their trucks on long trips and get boosts wherever necessary. The charge for this service would be billed to the light company furnishing the battery service and a certain proportion of this bill charged to the customer.

EDISON AND WARD DISTRIBUTION AND SALES SCHEME WILL BRING ELECTRIC DELIVERY WITHIN REACH OF THE SMALL MERCHANT

The poor horse received another knock-out blow when the wizard Edison, together with C. A. Ward, secretary-treasurer of the Ward Motor Vehicle Co., put into execution a new sales and service plan on September 22nd.

On the 20th, the plan was discussed at the Edison laboratory by a group of electric light and central station engineers, together with the Ward salesmen and Edison factory men. Briefly, the system consists in selling on time payments the "Ward Special" fitted with Edison storage battery. The usual price of the car thus equipped is $1350, but under the new arrangement the car will be sold for $875, a small payment being made at the signing of the contract, a larger payment upon delivery, and a monthly payment of some $45 or thereabouts thereafter. The battery, however, is not sold, but remains the property of the Edison Co., a portion of the $875 being rental for same.

The Edison Co. will inspect and maintain the battery in proper condition, and supply the charge for same up to 650 miles per month vehicle operation at the moderate figure of $10.50 per month. Any distance in excess of this amount is charged for at the rate of $.01¼ per mile, the mileage being determined by a sealed odometer supplied with the vehicle and read by the Edison monthly inspection men.

Arrangements have been made with some fifty or more stables and garages in and around New York City to care for these cars at $10 per month, so that the total maintenance charge for garaging and charging is approximately $20.50. As the stable and feed for an ordinary horse is about $27 per month, it will be seen that this new arrangement brings the car within the reach of the average small merchant, who has any credit standing.

The vehicle, battery, electric light and central station men are planning to dispose of two hundred and fifty of these vehicles within forty days. If the method proves successful in the New York and New Jersey territory it will in all probability be rapidly extended to other parts of the country. Representatives of the New York Edison Co., the United Electric Light & Power Co., the Edison Electric Illuminating Co., of Brooklyn, the Electric Department of the Flatbush Gas Co., the New York & Queens Electric Light & Power Co., and the Public Service Electric Co., gave the new plan their hearty endorsement and have promised their co-operation and support to a specific sales campaign proposed by the Ward Motor Vehicle Co.

At the special luncheon at the Edison plant, presided over by H. G. Thompson, vice-president and general sales manager of the Edison Storage Battery Co., C. A Ward explained the campaign, and in his remarks claimed that the car could be maintained in tires for less than it would cost to shoe a horse.

Electric Light and Central Station Engineers With Edison

At this gathering was consummated an arrangement by which the small Ward electric vehicle shown, is to be marketed on time payments, and fitted with Edison storage battery on a rental basis, thus bringing automobile delivery within the reach of any one horse user. This meeting marked a new epoch in vehicle and battery distribution.

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EXTRACTS OF ADDRESS BY ROBT. BLAND, PRESIDENT ASSOCIATED GARAGES OF AMERICA, AT CHICAGO E. V. A. SECTION MEETING

The garage business is divided into three classes, the gas garage, the combination garage, gas and electric, and the exclusive electric garage. We have a few exclusively commercial garages and a few motor livery garages. We have approximately 165 garages in Chicago and suburbs, divided as follows: Ninety-seven gas garages, fifty-seven combination, eleven exclusively electric garages, representing an investment of at least $50,000. Speaking about the garage business as an investment proposition, the gas garage is by far, the most profitable.

The exclusively electric garage business is one of the hardest grinds a business man ever tackled. It means very long hours, constant worry, abuse,—in fact, the electric garage owner around Chicago, is the goat for the entire electric pleasure vehicle business. This is principally due to the lack of co-operation between the manufacturer's representative and the electric garage owners.

We have to-day one of the most deplorable conditions in Cook county, in the electric garage that you will find in the world. You might duplicate it in Russia. It is principally due to the selfish system adopted by the manufacturer to dispose of his cars. He is not satisfied with his first profit on the sale of a car together with the enormous profit he makes on parts, as he feels that he is the only one that should make repairs, furnish batteries, tires, etc., and he has gone the limit in this direction by giving unreasonable guarantees on batteries, in some cases, as high as 15,000 miles, two years.

The manufacturer well knows that the garage man cannot follow him, and in fact, I hope that no honest garage man ever will. The manufacturer also knows that the battery of the electric vehicle is the key to the balance of the car and should he lose on the sale of the battery he will make up on other work,—or better still,—give the owner a very high figure on an estimate for general overhauling his car with the sole object in view of selling him a new car. If the owner is astonished at the condition of his car, as represented to him in the estimate and he gets sore, they tell him, in a nice way that the car has not been properly taken care of in the garage and the best thing he can do, would be to buy a new car, and change garages. What show has the garage man against a death dealing policy of this kind?

Every time a car goes to some of the manufacturers, the owner receives a list, a foot long, with five to twenty-five knocks on the garage, not one on the owner, not one on the manufacturer. If this system goes on, don't you think you will drive the electric car user to the gas route? I know you will and you are doing it now and nobody knows that better than the electric garage owner.

You cannot possibly succeed along the lines you have worked in the last year. Some of you have become past masters in the art of knocking and what has it done for you and the electric vehicle business in general? Nothing. Less than 2 per cent. of the electric garages are making any money, the majority of the electric garages are on the market for sale and unless the electric garage owner is given a chance to sell batteries, tires, etc., and do general overhauling, and repairing, in the county of Cook the same as he does in every other city in the union, you will kill the electric vehicle business, unless you have in mind to starve out the garage owner and get into the garage business yourself. Well if you ever do this, what will you do for a goat? The average car owner to-day, has lost confidence in the garage owner, principally due to the follow-up system of the manufacturer's service department. A system which has created more dissatisfaction with the car owner than any other means which has been used to secure business.

Within the last month, a ray of sunshine has come into the hearts of the electric garage owners, as one of the electric car manufacturers is selling its cars without batteries, allowing the garage to loan the battery, to the owner, on a monthly rental basis. This plan has been worked out in several cities and has proved very satisfactory. At last the electric garage owner is coming into his legitimate rights, and it goes without saying, that the garage owners feel very grateful to this company for their action. Two weeks later, this same company informed the public that the average electric garage could make the necessary repairs on their car on account of its simplicity and that it was not necessary to bring the car to their factory for repairs.

This company has done the garage man considerable good and it will have the tendency of returning him to his rights with the public. What is going to be the action of the other manufacturers in this matter?

I believe that it is the duty of the Electric Vehicle Association of America to do all in its power to bring the manufacturer and garage owner, closer together.

"Baby Motor Truck" as a Companion of the Commercial Car

By GEORGE W. GRUPP

NOWHERE can we find such an endless procession of speed, invention, industrial progress and organizing efficiency as may be found in the United States. The world seems to be getting smaller as railroads, steamships, street cars and commercial cars are geared up to a higher point of efficiency. Better methods of hauling freight, package merchandise, etc., must be installed as the cities increase in population and area and the freight houses, factories and industrial plants, of all sorts, become more crowded and congested. Thus far, our freight, mercantile and industrial experts and inventive geniuses have kept pace with this procession of progress.

And in this parade of events the motor truck has more than proved its worth in industrial and commercial enterprise. But one thing is still lacking. And that is, in order to get the maximum efficiency out of a motor truck it must be kept constantly busy and never permitted to lie idle longer than is absolutely necessary in the waiting to be, or in the act of being loaded or unloaded. Crude and slow methods must be forsaken.

Just as the horsecar, the velocipede, the horse, the wooden rails and bridges, and the famous Carnegie Steel scrap piles had served their purposes, so also has the hand truck. It must give way to a better and quicker vehicle such as the "Baby Motor Truck" if progress is to continue.

Now if it is true that railroads loose $80,000,000 a year which might be saved had they used industrial trucks, also that where they have been employed a savin of 66 per cent. is possible, then it is not an idle dream to say that several hundreds of millions of dollars are lost each year by our railroads, industrial and mercantile houses and motor truck users, combined, because of the slowness in hand truck loading and unloading.

The Automatic Transportation Co., of Buffalo, N. Y., manufacturers of "industrial storage battery trucks," (awarded one of the gold medals at the Panama-Pacific Exposition), which are designed for and are in active operation in nearly one hundred different occupations where freight handling is necessary about the premises or in loading or unloading of railroad

The Old and New Way of Handling Baggage

The view at the left shows five men pushing a hand truck. The view at the right shows two men handling about twice the amount with an industrial truck

Industrial Trucks at Work

The views above show the trucks working in numerous lines of endeavor. This illustrates very well what a wide range of work the trucks will do

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cars or motor trucks, have demonstrated how indispensable they are in industrial and commercial progress. Not only have they found that the "Baby Motor Truck" can handle six times as much freight, haul loads on a 15 to 25 and even 35 per cent. grade, save 25 to 50 per cent. in wages, dispense with the services of three to four men, do the work more quickly and efficiently, but also aid in making the motor truck more efficient.

Its aid in making the motor truck more efficient is not only due to its speed and increased carrying capacity, but because of its movable end gate. On this gate freight may be skid in loading or unloading—from motor truck to industrial or vice versa, this depending on existing conditions.

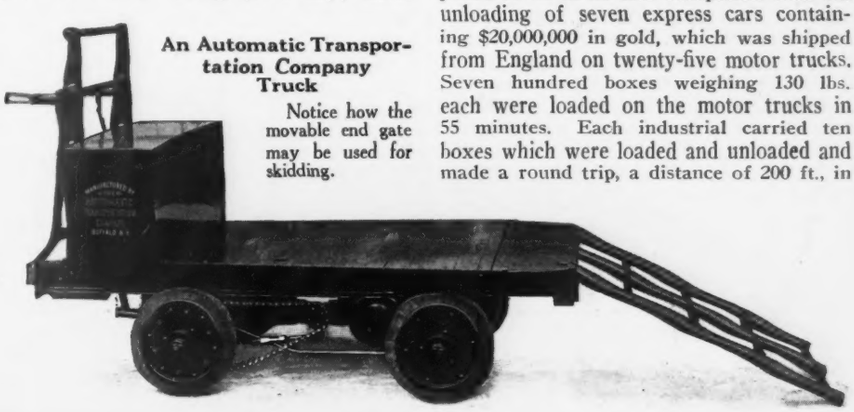
What It Has Done

In order to get an idea as to what one industrial can do at one time a few samples will be cited. It has carried forty-six fair sized boxes on a 35 per cent. grade from boat to pier, while one man with a truck is only able to haul two such boxes; it has carried sixty, 20 in. in diameter, spools of wire; it has hauled 4500 lbs. of newspapers; carried very long iron pipes about a warehouse; carted 118 dozen alarm clocks; carried five fair sized kitchen stoves; also, it is being used for inter department transfer service in such automobile factories as the Overland, Pierce-Arrow, Cadillac, Hudson, Buick, Reo, Studebaker, Packard, etc., it has replaced four to eight men and cared for all the material made by twenty mills in a sheet and tin plate rolling mill; it has carried 150,000 board ft. of rough lumber 600 ft., and return empty, in ten working hours; as a tractor it has pulled from one to four trailers ordinarily and as high as seven to eight and made short corners and through alleys; and many other things too numerous to mention.

As an Investment

As a profitable investment, when there is enough freight to warrant its operation, may be easily proven. Take for example, the Central Vermont Railway Co. It claims that at Pier 29 East River, New York City, the trucks paid for themselves within the first seven weeks. Then take the Timken-Detroit Axle Co., which has been able to save $8 a day in labor in handling its boiler room coal; while the Pierce-Arrow Motor Car Co. find that with a single truck it is able to dispense with the services of five men whose wages approximately amount to $500 per head per annum, save considerable time and charge the batteries of each truck each night at a cost of 24 cents.

Randolph-Clowes Co., the Waterbury copper and brass rolling mill concern is able to save $10 per day with its truck. Minus its cost of operating, upkeep and depreciation it is saving $2 a day; while the New Bedford Cordage Co. is saving $15 a week and able to do 25 per cent. more work.



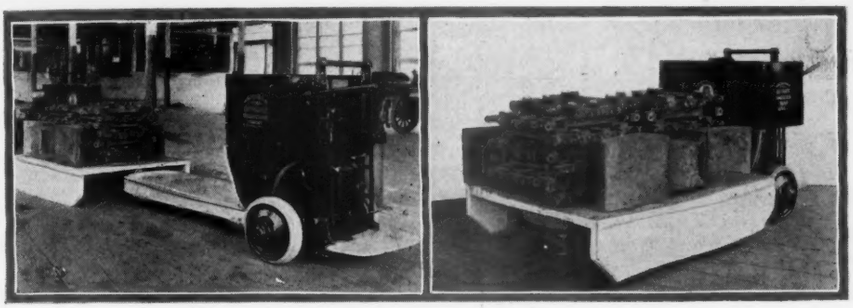
An Automatic Transportation Company Truck

Notice how the movable end gate may be used for skidding.

As a Time Saver

But now for a moment let us examine a very recent experience whereby the industrial truck aided in getting the maximum efficiency out of a motor truck which happened to be in no less occupation than the unloading of seven express cars containing $20,000,000 in gold, which was shipped from England on twenty-five motor trucks. Seven hundred boxes weighing 130 lbs. each were loaded on the motor trucks in 55 minutes. Each industrial carried ten boxes which were loaded and unloaded and made a round trip, a distance of 200 ft., in 49 1-7 seconds. As these industrials travel 7 m.p.h., the distance was made in 19 seconds, leaving 30 1-7 seconds for loading and unloading. If hand trucks had been used it would have required three men to move 1300 lbs. from car to motor truck at a speed of only 2 m.p.h. Therefore, it would have required 1 minute and 38 seconds and three men to do the same work that an industrial with the aid of only one man performed in 49 1-7 seconds, or a saving of 49 seconds and two men; or in the 70 trips about 57 minutes.

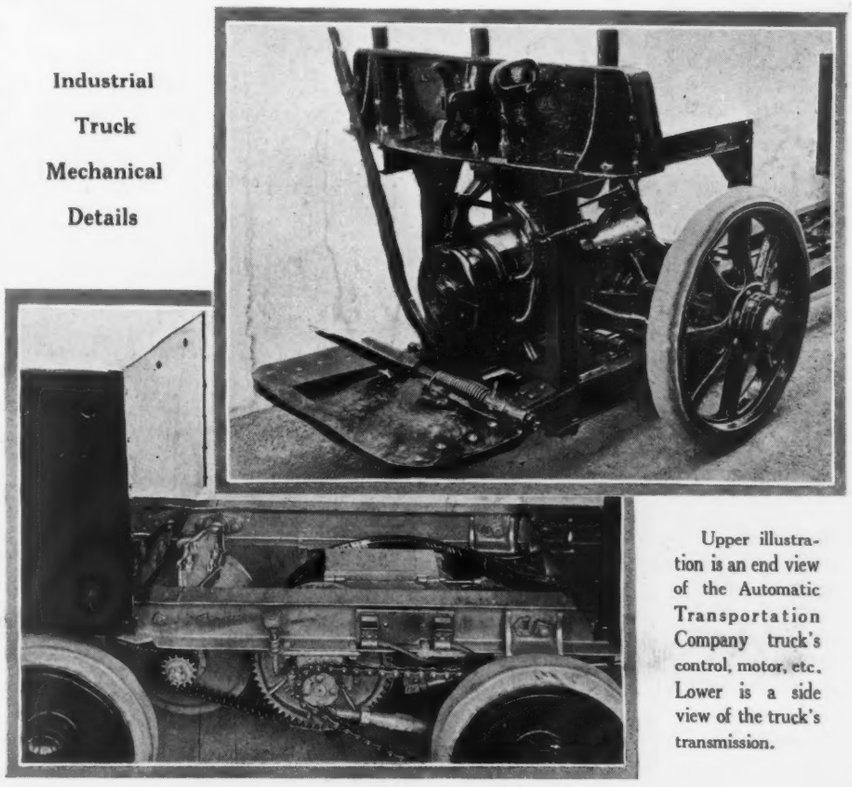
In conclusion the industrial truck is a tremendous saver of time and an indispensable companion and co-worker of the motor truck.



A Two-Ton Gear-Driven Lift Truck

The view at the left shows the truck approaching a loaded platform, while the right view shows the truck with its load lifted off the floor and ready to carry away

Industrial Truck Mechanical Details



Upper illustration is an end view of the Automatic Transportation Company truck's control, motor, etc. Lower is a side view of the truck's transmission.

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